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BEST PRACTICES IN COLLABORATIVE LOGISTICS

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Abstract

Increasing competition and shorter product lifecycles have required the development of strategic partnerships among suppliers, manufacturers, distributors, retailers, and logistics companies. Collaboration levels have increased dramatically in the past three years and will continue to do so. They bring participants benefits that might otherwise be unattainable without these partnerships. In order to identify the best practices in collaborative logistics, this thesis will explore the various forms of collaboration that have been or currently in practice. These include collaborative forecasting and inventory management, transportation, distribution, and warehousing. Case studies will be used to highlight the benefits of each practice, challenges, and a general framework for organizations looking to implement them. Because collaborative logistics is a rapidly evolving area in supply chain management, the thesis will also provide a future outlook into the direction it is headed.

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Introduction

Although collaboration might be one of the oldest business strategies, it is not the most widely practiced. Most companies remain hesitant about partnering. They fear loss of control, dilution of competitive advantage, and even confusion in the marketplace. The reality, however, is that formerly unattainable benefits can, and do, emerge when parties willingly share information, work together to surmount problems and barriers, and jointly develop and implement ideas for improving supply chain performance and attracting new customers.

The term "collaboration", not the activity, is often overused, which makes collaboration seem less potent than it really is. The reality, however, is that collaboration is key to helping companies achieve high performance. Executives surveyed in numerous studies have listed collaboration as one of their key strategic priorities, but the term is exceptionally general. It can mean different things under different contexts, but for the purposes of this paper, "collaboration" is taken to mean cooperative supply chain relationships- both formal and informal partnerships between companies and their suppliers, business partners, or customers, all with the mission to enhance the overall business performance of both sides. The purpose of this thesis is to identify the best practices in modern collaborative logistics, the general frameworks for each, and how to implement those into existing organizational processes.

Why Collaborate?

According to independent research conducted by AMR, Accenture, and the Voluntary Interindustry Commerce Solutions Association (VICS), superior collaborations have helped manufacturers realize the following benefits:

- Reduce inventory levels by an average of thirty percent;
- Cut transportation costs by an average of ten percent;
- Lower warehousing costs by an average of thirteen percent;
- Shorten lead times by an average of fifty percent; and
- Improve customer service by an average of ten percent.

Retailers have also seen the following advantages take form:

- Raise store-shelf-stock rates by five to eight percent;
- Reduce inventories by an average of ten percent; and
- Cut logistics costs by three to four percent

(Matchette, 2005)

History of Collaboration and Early Frameworks

Business collaboration has increased significantly and evolved in several aspects in the past twenty years with the introduction of EDI, the Internet, and sophisticated supply chain planning tools. These tools have helped companies to minimize waste in their processes as well as their customer and suppliers' processes.

In the past, there have been frameworks that were less successful, but paved way to more successful models which will be explored throughout the paper. Efficient Consumer Response,

known as ECR, began in the grocery industry in the 1990s. Participants from the industry wanted to become more responsive to consumer demand while reducing costs from the supply chain. In the 1990s, Church & Dwight and their clients, H.E. Butt and Wakefern (also known as ShopRite) combined EDI and PC-based forecasting and replenishment software to import customer data such as point of sale at the retail level, inventory levels, shipments, and open purchase orders at their distribution centers. The vendor in the case, Church & Dwight, would then use this information to place orders for H.E. Butt and Wakefern. At first, this came at an additional cost, but it helped the manufacturer improve its own sales forecasts and inventory location placement.

Identical to the ECR program, the Quick Response (QR) program was initially implemented by the apparel industry in the 1980s. QR gathers point of sale data to infer consumer preferences with a goal of integrating the information into production schedules. Using EDI technology, the data is communicated upstream to influence planning decisions as a response to what consumer trends seem to be. The net result of QR was that textile mills, apparel manufactures, and retailers collaborated to respond efficiently to consumer demand.

According to a 2002 study at the MIT Center for Transportation and Logistics, entitled "The Value of CPFR", "both of the ECR and QR initiatives were slowly adopted across the respective industries that spawned them. They did help change attitudes and create the realization that companies must look beyond their own boundaries to achieve high levels of customer service and low costs. The collaborative aspects of these processes, however, were never implemented as originally envisioned on a large scale, mainly due to the cultural difficulties associated with collaborative management and the lack of scalable software," (Sheffi, 2002).

Collaborative Planning, Forecasting, and Replenishment

Collaborative planning, forecasting, and replenishment (CPFR) is a more detailed and comprehensive type of relationship than QR and ECR. In the past, inventory strategies such as Vendor Managed Inventory, Supplier Managed Inventory, or Collaborative Replenishment focused on collaboration for efficient replenishment; however, these strategies only addressed one aspect of the supply chain, neglecting other considerations such as planning and forecasting. The focus of CPFR is wider and its objectives more ambitious. It is a cross-industry initiative designed to improve the supplier/manufacturer/retailer relationships through co-managed planning processes and shared information while the ultimate focus is on the consumer. The practice began in 1995 as a pilot program between Wal-Mart and Warner Lambert and in 1997, the Voluntary Interindustry Commerce Solutions Association (VICS) developed the CPFR model and published the first CPFR guidelines in 1998. Since then, according to the VICS website, more than 300 companies have implemented the process. It is the third most widely used initiative in supply chain management (Lapide). As these companies worked with CPFR, shortcomings were identified and innovations were developed that were incorporated in a 2004 major model revision by the VICS CPFR committee.

The original CPFR model consisted of nine steps that standardized the way by which trading partners can collaborate on replenishment and merchandising. However, it prompted many comments that the model was too “rigid, complex, expensive, and time-consuming”, said Joe Andraski, the managing director for VICS (Andraski, 2012). Therefore, in 2004, the VICS board developed a new model that only consists of four elements, any of which can serve as a platform for collaboration, said Andraski: Retail Event Collaboration, DC Replenishment

Collaboration, Store Replenishment Collaboration, and Collaborative Assortment Planning. ("CPFR: An Overview", 2004)

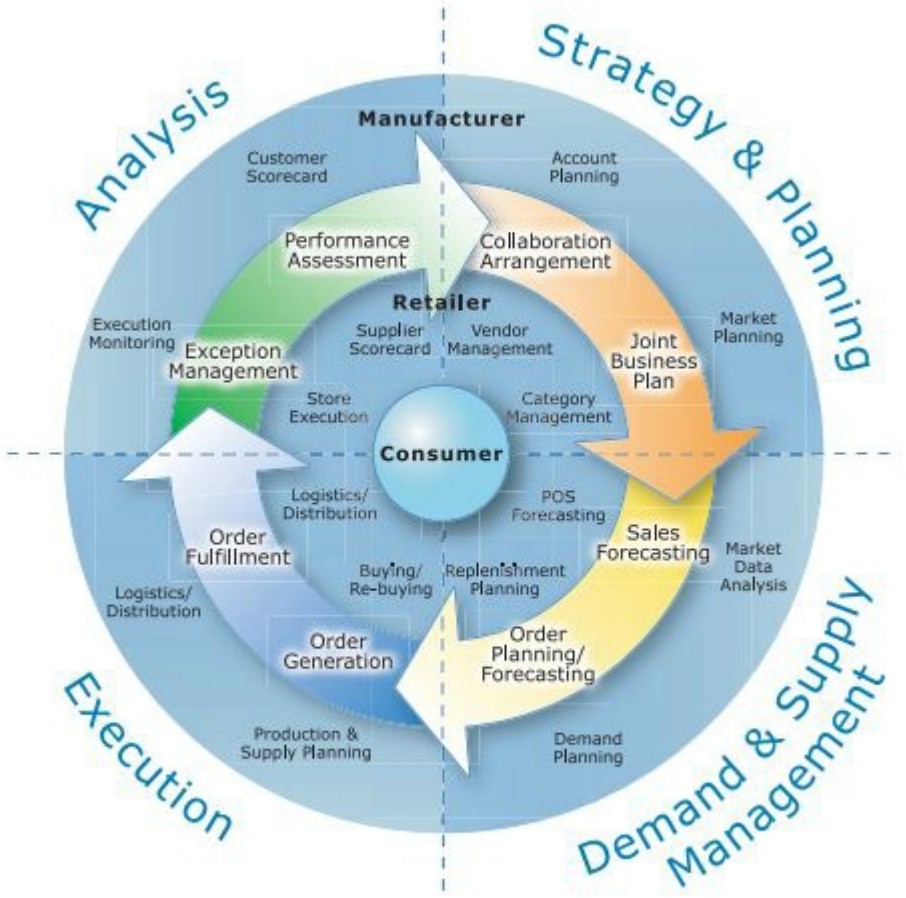

Figure 1 Manufacturer and Retailer Tasks

The reference model in Figure 1 above ("CPFR: An Overview", 2004) provides a general framework, applicable to most industries, for the collaborative aspects of planning, forecasting and replenishment processes. There is a buyer and a seller, who work together to satisfy the demands of an end consumer, who is at the center of the model. In the retail industry, the *retailer* will fill the buyer role while a manufacturer fills the seller role, and the consumer is the end customer in the diagram. The roles may be a different in other industries, such as high

technology. The buyer would be the original equipment manufacturer (OEM), who assembles electronics from component suppliers, who will fill the role of the seller, and finally deliver the product to the end customer- a financial services company. For purposes of this paper, the examples will be limited to those in the retail industry.

As depicted in Figure 1, the seller and the buyer engage in four Collaborative Activities to improve their performance. Within the four activities are specific Collaboration Tasks- two for each:

1. **Strategy & Planning-** *Collaboration Arrangement* is the process of setting the business goals for the relationship, defining the scope of collaboration and assigning roles, responsibilities, checkpoints and escalation procedures. The *Joint Business Plan* then identifies the significant events that affect supply and demand in the planning period, such as promotions, inventory policy changes, store opening/closings, and product introductions.
2. **Demand & Supply Management –** The *Sales Forecasting* step projects consumer demand at the point of sale, and *Order Planning/Forecasting* is when the partners jointly agree upon a forecast that determines future product ordering and delivery requirements, inventory positions, transit lead times, and other factors.
3. **Execution**- The *Order Generation* step transitions forecasts to firm demand and *Order Fulfillment* is the process of producing, shipping, delivering, and stocking products for consumer purchase.
4. **Analysis**- Tasks in this stage include *Exception Management*, the active monitoring of planning and operations for out-of-bounds conditions, and

Performance Assessment, the calculation of key metrics to evaluate the achievement on previously agreed-upon business goals, to uncover trends or develop alternative strategies if necessary.

For each Collaboration Task in the model, there are corresponding Enterprise Tasks that personnel on the retailer and manufacturer sides perform. For example, during the first step in the Strategy & Planning stage, the manufacturer's sales teams perform periodic strategic account planning, while the retailers conduct vendor management reviews. When the trading relationship involves CPFR, the teams that are responsible for these enterprise processes come together to produce the Collaboration Arrangement.

The CPFR model is modified from the original to be flexible. It can be extended to encompass more than two tiers of trading partners. "N-tier collaboration" is the term used to describe relationships that progress from retailers through manufacturers or distributors to suppliers.

Due to its flexibility, any individual CPFR program can adapt the model to the particular needs of the trading relationship. Of the alternative approaches that have been documented, four specific scenarios have dominated large-scale CPFR deployments, as listed on the VICS website. To better assist companies who are contemplating CPFR initiatives, or are engaging trading partners in their programs, VICS has provided detailed process guides accessible to their subscribers online.

Retail Event Collaboration

In many retail environments, promotions and other retail events generate the largest swings in demand, and as a result, the majority of out-of-stocks, excess inventory and unplanned logistics costs. Consequently, retailers in these highly promoted channels have focused their collaboration efforts on retail events, where their financial opportunity is greatest. The Retail Event Collaboration scenario of CPFR provides an industry-standard approach to this process. Trading partners develop a collaboration strategy and a joint business plan for promotions, typically on an annual or quarterly basis. They then work together to determine the impact of planned events on consumer demand and retail distribution. As events occur, promotional orders are placed, and delivery takes place. Then the event is executed in stores. Along the way, exceptions related to event planning or execution may be identified and resolved. The process concludes with an evaluation of event performance.

DC Replenishment Collaboration

DC replenishment collaboration is a CPFR scenario that enhances continuous replenishment programs such as co-managed inventory or vendor-managed inventory (VMI). Conventional replenishment programs typically calculate order requirements in a short lead-time horizon. A single trading partner entity manages the entire process.
By contrast, DC Replenishment Collaboration offers a joint order commitment process at multiple horizons beyond a single lead-time. DC Replenishment Collaboration enables manufacturers to adopt a make-to-demand policy, while allowing retailers to minimize their inventory liability and stock-out risk. Trading partners typically collaborate on DC withdrawal forecasts, manufacturer-to-retailer DC forecasts, or both. The output of collaboration is an order

or series of orders that are committed over a time horizon. The buyer and seller support order generation with their buying/re-buying and production and supply planning organizations, respectively. DC Replenishment Collaboration extends the replenishment process beyond the buyer's DC and seller's finished goods warehouse to encompass all the nodes in the supply chain – from the store shelf to raw materials. Documented benefits attributed to this type of collaboration include greater visibility to improve replenishment accuracy, stock-out reductions, overstock reduction, and better alignment of capacity to customer demand. DC replenishment collaboration also seeks to increase the efficiency of the flow of product between trading partners, especially in supply chains that have long supply cycles, heavy, bulky or regulated goods, or complex transportation requirements.

Store Replenishment Collaboration

As with DC Replenishment, conventional store replenishment programs are executed by a single trading partner over a single lead-time horizon. Many retailers are now sharing more responsibility for the store-level availability of products via store-level collaboration initiatives. Store Replenishment Collaboration leverages the insights of both the retailer and manufacturer to drive an optimal replenishment plan. Trading partners typically collaborate on store point of sale (POS) forecasts. The output of Store Replenishment Collaboration is an order or series of orders that are committed over a time horizon. The buyer and seller support order generation with their replenishment planning/buying, re-buying and production and supply planning organizations, respectively. Store collaboration is focused on the closest link to the consumer and consequently directly influences shelf availability. The benefits attributed to Store Replenishment

Collaboration includes greater visibility to consumer take-away, improved replenishment accuracy, improved in-stocks, overstock reduction, and improved promotional execution. Trading partners have a direct view of how consumers are responding to new products, existing shelf distribution and promotional take-away. Manufacturers and upstream suppliers leverage this information throughout the supply chain for improved operational execution.

Collaborative Assortment Planning

Some industries, such as fashion apparel and accessories, follow a seasonal rhythm of demand. As a result, collaborative planning in this market segment typically has a horizon of a single season and is performed at seasonal intervals. The nature of fashion and other short lifecycle products implies that there is minimal discrete historical data to utilize in the planning cycle. Hence, there is a heavy dependence on collaborative interpretation of industry trends, consumer tastes and macroeconomic conditions. Collaborative Assortment Planning is a process that allows retailers and suppliers to better coordinate their merchandising decisions to drive maximum profitability for both constituencies. Trading partners jointly develop an assortment plan, which contains both visual representations of the product and financial models. The output of this collaboration process is a planned purchase order containing item commitments at the universal product code (UPC) (style/color/size) level for each delivery point in the retailer's enterprise. The planned order is electronically shared in advance of a market or show, where sample products are viewed by the buyer and seller and final merchandising decisions are made.

With these frameworks and their benefits in mind, there are steps that must be taken by each of the interested parties to ensure they are prepared internally to partake in a successful

implementation of CPFR. There are three fundamental internal requirements that need to be satisfied prior to the commencement of these initiatives. The support and commitment of senior management to the vision of this initiative is vital to ensure the assignment of the necessary dedicated resources and drive the changes within the organization. It is likely that CPFR will require a considerable change in internal processes and workflows; therefore, people within the organization must be prepared to change their working habits.

Technology is no longer seen as a major barrier to success. Despite the fact that the majority of companies consider themselves ready to collaborate, their trading partners doubt the willingness of these companies to exchange information. However, it appears to be the case that as competitive pressure increases, so does the willingness to collaborate among supply chain partners.

The real key to a successful implementation of CPFR is the forging of cultural alliances rather than traditional supplier-customer relationships. Partner selection is equally important; trading partners usually represent approximately seventy-five percent of sales/spend (Lapide, 2011). As explained previously in the first Collaborative Action, successful collaboration requires that interested parties agree upon a set of common goals and measures and this begins by sharing their own respective internal metrics. Trust is sometimes an issue when companies are asked to share their own data with outside parties, but a critical component of any collaborative relationship is the willingness to shift orientations from product-focused to customer-focused. No single business process fits all customers; thus, collaborative processes must be customized.

Advanced technology is not a prerequisite for CPFR, but may be beneficial if parties are seeking a completely integrated implementation. CPFR may be conducted without any special tools; it can be as simple as using spreadsheets and sending data between trading partners via e-

mail or fax; or more thoroughly integrating CPFR throughout the company by using forecasting tools, special interfaces for data transfer, and integrating the collaboration data into other company systems. If a company is willing to focus their efforts on attaining all the potential benefits, at least one of the trading partners must have each of the following processes and systems distributed throughout the company: forecasting, demand planning, distribution planning, transportation planning and production planning. An S&OP system is a good example of an advanced level of technology preparedness to simplify and ensure accuracy of information sharing.

Measuring the level of success from these collaborative efforts requires a set of key performance indicators that may be used for intra- or inter- company wide benchmarking and provide a clear definition for setting common improvement targets. The Global Commerce Initiative (GCI) released a Global Scorecard that has served as the basis for such metrics. Such metrics include finished goods inventory, material inventory, forecast accuracy (sales, order, materials), service level (production, delivery, out-of-stock frequency, on-shelf availability), lead-times (order-delivery, order-production), distribution (empty miles, costs, vehicle fill), sales growth, and planning (material, production, capacity, and transportation) (Lapide, 2011). Only a limited number of KPIs most relevant to the current relationship of the trading partners should be selected in order to facilitate implementation.

Whereas most CPFR implementations are initiated by retailers, one of the most successful cases of this program was actually initiated by a manufacturer. Motorola realized that accurate forecasting and replenishment decisions were becoming very complicated because cell phones have life cycles as low as six months; there were also multiple SKUs per model. Industry statistics indicate that fifty percent of stock-outs in the consumer goods industry are due to poor

retail order and replenishment/forecasting processes (Cederlund, 2007). In 2002, Motorola turned to CPFR to improve sell-performance with its retailers. The goals were to lower forecast error, reduce inventory by thirty percent, and improve on-time delivery by thirty percent. To meet its goals, the division's managers understood the need to share with their retailers their real-time data and plans including forecasts, inventory, sell-through, promotions, product plans, and exceptions. Motorola was ready to make any internal changes necessary to push the program forward. They realigned their business strategy, reworked key processes, and finally reorganized their internal structure.

Using VICS CPFR implementation guidelines, Motorola began working with a selected North American retailer to agree upon appropriate service levels, metrics, and a plan for continuous improvement. When selecting the retailer, the team considered the retailer's culture as well as its current relationship with Motorola. This particular retailer's culture was not antagonistic toward suppliers but focused on the process and the causes of market share loss resulting from poor delivery. Hence, it was clear that both parties would benefit from a long-term collaborative relationship to help them achieve similar goals.

As Motorola and its retailer changed their processes, organizational structures and information systems needed to change to align with the new collaborative business model as well. Although it was not required by the CPFR model to have a very advanced IT set-up, CPFR includes a significant amount of information sharing. For a large company like Motorola, it was critical to have more advanced information sharing capabilities beyond Excel spreadsheets. Once the new processes seem to be performing well, Motorola moved to a specialized collaborative system provided by Manugistics (now JDA), eventually incorporating XML for direct integration with its supply chain software. While CPFR can work with a simple Excel spreadsheet, these

spreadsheets are prone to manual errors and are time-consuming to create and update than automating such processes with Manugistics. The Manugistics system offered several advanced features such as automated input of demand signals into Motorola's overall planning system; automated feedback to the customer of Motorola's supply commitment; automatic analysis of inventory over- or understock with signals to responsible planners; and "management by exception" instead of a line-by-line examination of inventory (Cederlund, 2007).

Originally, if there were a problem between the companies, the representatives on each side would have to relay issues to others within their own companies. This created many issues since the "primary contact" often lacked all the facts and the skill set to discuss issues that may occur over a broad range of topics. Therefore, Motorola created account-based operations teams for each of their collaborative retailing partners. The separate functions that had previously provided input to the sales team, including customer advocacy, business operations management, finance and credit, regional marketing, product operations, pricing programs, and customer development were pulled together into a dedicated customer account team headed by the strategic account manager for that retailer. This team became the primary contact for discussions on various planning stages. Similarly, the retailer combined separate functions including purchasing, inventory management, finance, marketing, operations and sales to form a supplier-focused demand planning team. Collaborative relationships were now stronger because there was a direct communication on all issues between these two groups.

Formal communication processes were also set up at multiple points along the supply chain. Each week, a collaborative planning meeting was set up for the companies to review the performance in replenishment, prior and current week sell-through, and inventory position. This allowed them to address any issues upfront and decide on any corrective actions immediately.

Traditionally, in most supplier-buyer relationships, demand forecasts are prepared independently. Suppliers have a limited view of the buyers' markets while buyers lack a broad view of category or market insights as well as production and capacity planning. This often leads to excess inventory. To improve forecast accuracy, Motorola convinced the retailer to move its planning cycle up by two or three days, which eliminated a seven-week forecast lag that had been the result of the forecast not being incorporated until the next month's planning cycle. The retailer would load its forecasts for the next month on Monday. Motorola then loads its forecasts on Tuesday. On Wednesday, the two account-based operations teams jointly resolved discrepancies and concluded with a mutually agreeable forecast.

Motorola saw almost immediate results in forecast accuracy improvement. The mean absolute percent error (MAPE) was a fraction of its previous levels. They saw inventory levels decrease by thirty percent at the retailer's distribution center because there was less need for buffer stock. Stock-out rates were less than a third of previous rates. Transportation costs were cut in half because Motorola was no longer shipping multiple pallets daily, many of which had been in less-than-truckload shipments. With improved forecast accuracy, the company could plan longer production runs and ship full containers.

Although CPFR was a major breakthrough in supply chain management, it never became as momentous as its founders anticipated it would be. Once the Dot.com bubble burst in March 2000, the enthusiasm for CPFR waned despite ample evidence of its benefits from the VICS pilots. Along with the World Wide Web, CPFR went through its trough of disillusionment. Companies decided it was too difficult to scale up the piloted processes to collaborate with larger sections(?) of their retail-customer bases. Many implemented it in standardized form with a handful of their major, most-demanding, and capable customers.

As CPFR gains in complexity through the integration of suppliers, roles and responsibilities become more critical. CPFR is not about involving everybody in anything within supply chain operations, but about involving the right organization and people at an essential point in time. It is very important, therefore, that the roles and responsibilities of CPFR participants are clearly defined, assigned and mutually agreed upon. Although it is recognized that there is a need to include upstream suppliers in CPFR initiatives, few demonstrable experiences are available and the necessity to prove the concept through actual experience remains.

Collaborative Transportation Management

Collaborative Transportation Management (CTM) can be viewed as an extension of CPFR; it is the process of converting order forecasts developed via CPFR into shipment forecasts and collaboratively ensuring the accuracy of order fulfillment. CPFR is primarily a buyer-and-seller based collaboration, but CTM reengineers the process so that the carrier also becomes part of the buyer/seller relationship. In general, the benefit of collaborating on the transportation aspect allows the participants to share the costs of large investments, pool and spread risk, and gain access to complementary resources.

"Collaborative supply chain operations are a growing trend across industries as companies seek to fully leverage their logistics infrastructure," John P. Bilbrey, president and CEO of Hershey, said in October 2011 when the $6 billion U.S. chocolate giant launched a joint transportation initiative with one of its largest competitors, Ferrero, the $9 billion manufacturer of Nutella and Ferrero Rocher chocolates ("Journal of Commerce"). Similar efforts have been

implemented at many manufacturers in response to a capacity picture that has undergone significant changes across the supply chain, especially since the 2008-2009 global economic downturn.

More specifically, the downturn for the trucking industry began in 2006 and worsened during the economic crisis, eliminating fifteen to twenty percent of the U.S. tractor-trailer fleet. More than 333,000 drivers have also been laid off between 2008 and 2010, reducing the total workforce by approximately 18.4percent. Truckload line-haul per-mile rates have increased 11.7 percent annually, and that percentage is expected to rise even higher- fifteen to twenty percent over the next few years (Regan, 2011). In addition, shippers have scaled down on inventories; carriers had to adjust capacity to a smaller market that has put a premium on flexibility, and domestic operators in the U.S. are matching capacity more closely to demand. In turn, this places greater pressure on logistics managers to find the right capacity in the right place at the right time. This also amplifies the issue of incurring empty miles, empty backhauls, and deadheads. According to the National Private Truck Council, approximately twenty-eight percent of the trailers on U.S. highways are running empty, at incalculable costs to the company and environment (Kerr, 2010). Because capacity is a fixed variable, shippers can only look for opportunities where there is empty or partially utilized capacity that is pre-existent. These opportunities usually come from collaboration with other shippers.

Traditionally, carriers and shippers have tried to fill backhaul opportunities by manually searching within their own company and through their existing networks to locate another shipper that may be able to share mutual lanes, trailers, and transportation costs. It is a process that is time-consuming and may only produce limited or no results at all; therefore, very few shippers have bothered wasting its resources investigating these options. More recently, third

party logistics providers have created their own in-house platforms suitable for collaborative transportation management. Most of these ask shippers to join a community of other shippers and carriers who are seeking collaborative partners, with the only expense being a modest annual subscription fee.

CTM, or Collaborative Transportation Management is a holistic process that brings together supply chain trading partners and service providers to drive inefficiencies out of the transport planning and execution process. The CTM process is designed for application to both inbound and outbound transportation flows. The guideline for a suggested course of action for those who are interested in implementing a CTM process into their system is illustrated in Figure 2 (Matchette, 2005).

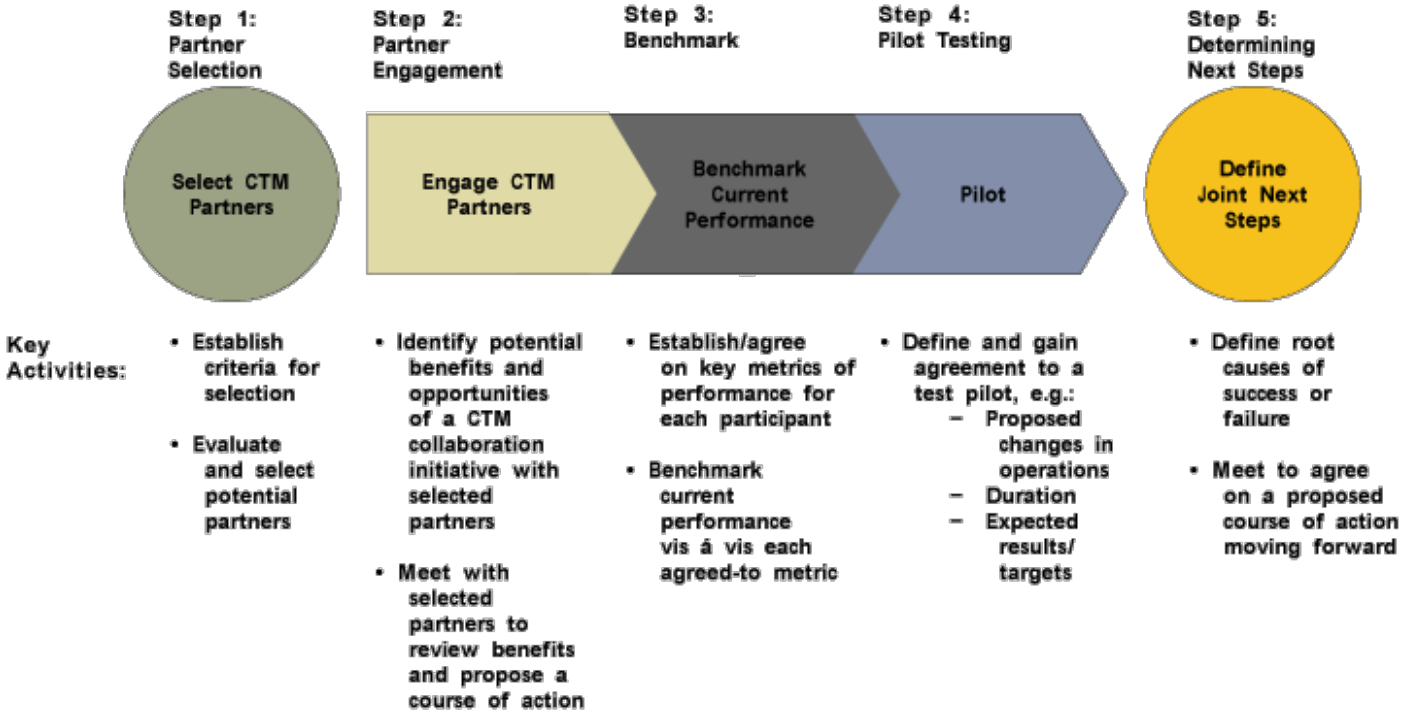

Figure 2. General CTM piloting process

The first major internet-based collaborative transportation network was launched in March 2000. General Mills, Land O' Lakes, Graphic Packaging International Corp, and Fort James Corporation (later Georgia Pacific), formed an alliance to reduce transportation costs for manufacturers and improve profitability for their carriers as well. When a manufacturer ships a truckload of product to customers, it is the carrier's responsibility to find products to haul back on the return trip. According to the American Trucking Association, carriers travel approximately 110 billion miles annual, but fifteen to seventeen percent of those are empty miles, which translate into a $21 billion inefficiency (Bearth). To address the problem, the manufacturer alliance used Nistevo's network to match routes that would create round-trip or dedicated tours between the manufacturers so the carriers are guaranteed a truckload on both trips. Collaborating on their transportation management enabled the manufacturers to sometimes enjoy rate reductions because their trucks were not returning empty; the carriers enjoy better asset utilization; the turnover of drivers decreased because they no longer have to scramble to fill their trucks on the return trip; and the service also improved because drivers became familiar with the routes and developed business relationships with shippers and customers.

For example, General Mills and Georgia Pacific formed a 1,800 mile tour that included shipping a truckload of products from a Mid-western General Mills plant to a distribution destination on the East Coast. Georgia Pacific then used the same truck to transport its products on the return trip to a Midwest destination. Their annual shared cost-savings accounted to more than $730,000. Their efficiency increased by nineteen percent, and service reliability by ninety-nine percent. The carriers' driver turnover also dropped dramatically (Byme, 2001).

Nistevo is a leading provider of SaaS transportation management solutions and was acquired by IBM in 2006, and is now part of IBM Sterling Transportation Management System.

Since its first major success story in 2000, Nistevo has gained a significant amount of participants, including major manufacturers like Kellogg's, Nestle, Nabisco, Hormel Foods, and ConAgra. Most members are in consumer packaged goods. Hundreds of carriers of all capacity sizes have also joined. With an annual subscription fee of $300,000 Nistevo creates benefits for all members of the community of participants. Nistevo identifies potential partners by comparing transit routes of the other members. This comparative analysis scores and ranks which companies would benefit from collaborating on common lanes. In 2001 alone, Nistevo had identified more than twelve million potential lane matches. After companies agree to collaborate over these identified lane matches, they then form their own community. Manufacturers also pay for their carriers to join the network for a nominal fee of $1000. Once such a community is created, the companies set ground rules amongst themselves such as who pays for what on different legs of a tour and which carriers to use. Companies may belong to multiple communities, which significantly increases the number of lane matches.

An appealing element of this program is that companies have control over which firms they choose as partners, which is a critical element for manufacturers. "You really do form a relationship with fewer rather than more because you need to feel comfortable and trust your business partners, "says Jeff Stubbs, logistics director for Ivex Packaging. "In our business (manufacturing), service is everything. I can't go back to my sales organization and say the reason why we were late delivering to this customer is because the truck from one of our [collaborative] business partners didn't come on time. That wouldn't fly," (Terreri). Nistevo does not force partnership upon anyone. Its purpose is to aid in the process of identifying and building quality relationships while delivering positive results.

Technology plays a major role in managing the complexities of a logistics system. The Nistevo Web site provides each of the company communities a comprehensive, secure, and private Web-page exchange where companies can communicate with each other keep track of their shipments in real time, as well as viewing other information such as benchmarking, presentations, and network updates. When companies and carriers join Nistevo, the terms and conditions of their contacts are plugged into the system, thus allowing both parties to view contracts and negotiate rates online. When manufacturers agree to a tour, they are required to negotiate rates separately with carriers to avoid violating antitrust laws. The network also allows manufacturers to post new shipments online and collaborate with carriers and other companies to arrange a return truckload.

Nistevo partners with Elogex, the pioneer of multi-enterprise collaboration software to optimize logistics asset utilization and improve supply chain efficiency. It is a web-based network that offers traditional TMS functions such as routing, rating, tendering, and tracking. Like most of its competitors, it sends alerts to the relevant parties when goods don't move as expected. One of its competitive advantages is its ability to build continuous moves by cooperating with just about anyone available, suppliers included. The Elogex Network was launched in December 2000 and operates on a hub-and–spoke model. The hub is the Elogex customer that implements the system (in this case, Nistevo), and the spokes are its suppliers and carriers. Users access the system simply through their web browsers and can integrate it with legacy systems. There is no need to install any new software to participate because Elogex is an application service provider (ASP). The hub company- Nistevo pays a subscription fee based on the number of sites and suppliers it has and its shipment volume (Douglas, 2002).

The Elogex Network may also help reduce some overhead costs in the company by easing the management of supplier compliances. The network allows the hub firm to maintain a routing guide and use its rules to determine how suppliers ship its products. After a supplier creates a shipment in the system, the shipper views the hub company's preferred carriers in order of priority. The system chooses the carriers based on the hub company's business rules and negotiated rates. The supplier will electronically tender the shipment to the first carrier on the list. The carrier will receive an e-mail alert of that offer. If that carrier declines or does not respond within a specified time, the system will offer the load to the second carrier, etc.

One of the most current and well-known programs of this sort is the Voluntary Interindustry Commerce Solutions Association (VICS) Empty Miles Program. VICS is made up of companies who have proven that by sharing an accurate flow of product and information between trading partners significantly improves their competitive position. In 2009, VICS and GSI launched a low-cost solution to optimize truck transportation by reducing the number of trailers traveling without loads throughout North America. The Empty Miles Service matches a company's trailers that are returning empty with potential loads that can be collected and delivered along the return route.

Participants of this program include several of North America's largest retailers, consumer goods suppliers and transportation carriers. They have found that the VICS Empty Miles Service helped them save money, produce revenues, lower fuel consumption and reduce greenhouse gas emissions overall. VIC members are charged a small fee of $1600 per year in subscription fees and non-members are charged $1,850 per year. Members may register as many routes as they would like to match with other partners.

The Empty Miles program is best for manufacturers and retailers with private or dedicated fleets who want to enter into longer term backhaul arrangements. VICS commented that this program is not a "broker board" or "route list" for finding truckers to handle one-time shipments. It is focused on overlapping "power lanes", which are the truck routes that companies use repeatedly and regularly (Andraski, 2012).

It is easy to use the VICS Collaboration Zone services. They are entirely web-based and do not require the participants to install or integrate into any new software on their end. At the VICS Collaboration Zone Empty Miles Portal, companies using the service will register their company profile, transportation information, and billing information. Empty lanes that need to be filled are input along with equipment specifications, driver certification, and environmental requirements to ensure accurate matches. Searches for matches are manually performed by the interested party and the portal will generate lanes that meet the specified criteria. Once a match is made, negotiations between the two companies are performed offline. Empty Miles offers tools and process checklists to assist in the agreement over costs, rules of engagement, metrics, and an eventual contractual agreement. An ROI or Benefits Calculator simplifies the cost/benefit analysis for filling the particular empty lane. It automates the process of simulating costs, revenues and determines the returns that accrue using the subscriber's specific data. Moreover, it also calculates the CO2 emissions reduction associated with eliminating the empty backhaul ("VICS Empty Miles", 2012).

VICS Empty Miles Service has opened up new interactions between carriers and shippers across a growing range of industries and has identified potential partners that may never have had reasons to work together before. For example, in 2010, Macy's found Schneider National as a partner in its empty miles reduction initiative. For two lanes opened not long after the launch of

the portal, Macy's annual transportation costs dropped by $25,000. Just fifteen months later, Macy's reported that thirty additional backhaul loads leave its distribution centers each week- which accounts to 1,500 more productive hauls per year compare to just fifteen months ago. This also equates to 722 tons of CO2 emissions reduced. Its partner, Schneider National reported an increased dedicated backhaul revenue by twenty-five percent, saved more than 5,500 gallons of diesel annually, eliminated 61.65 tons of CO2 emissions, 147 tons of particulate matter, and 1.5 tons of nitrous oxide (Kerr, 2010). Macy's made additional collaborations with J.B. Hunt and other smaller carriers. Schneider National and JC Penney also have another successful partnership. In 2010, there had already been forty corporations on board: approximately fifty percent shippers (including Best Buy, Nestle, and Johnson & Johnson), and fifty percent carriers ("GS1 US").

Despite several well documented success stories, Joe Andraski, CEO of VICS, said it fell short of expectations. Companies commented that it was too time-consuming and required too much effort on their part. These concerns often stemmed from change in management, and with each change, their perception of the value and importance of the program shifted. VICS is currently partnering with National Retail Systems Inc, to reengineer their Empty Miles program, seeking to simplify the user experience and to make it less time-consuming (Andraski, 2012).

Collaborative efforts have gained great popularity in the European nations as well, possibly more well-accepted than in North America. In 2003, Kimberly-Clark's European operations launched a distribution trial with Lever Fabrege (now Unilever) in the Netherlands and have since expanded to other countries. At the time, they did not expect it to become a supply chain best practice in Europe. The first experiment involved making joint deliveries to customers, with each company filling half of each truck. With that early effort, Kimberly-Clark

pioneered the concept of collaborative distribution (also known as collaborative supply chains), a practice that is sweeping Europe. This is especially popular amongst consumer packaged goods, and a nonprofit much like VICS has been established to facilitate such collaborations among CPG companies, retailers, and 3PLs. In a shared supply chain, two or more companies use the same distribution facility and transportation to serve mutual customers. This reduces costs for manufacturers and provides more frequent replenishment for retailers.

In 2003, some retailers in the Netherlands were trying to restock store inventory based on point of sale data and to make replenishment decisions based on actual customer transactions. They also wanted to increase the frequency of deliveries and resupply stores by replenishing what had been stored but this was in contrast to Kimberly-Clark's strategy to only deliver in full-truckloads. Kimberly-Clark wanted to team up with another company shipping to the same stores. Its first successful trial was with Makro, a warehouse club store chain. Their collaboration produced more than just transportation cost savings. By shortening cycle time for deliveries, collaborative distribution could also reduce store inventories while increasing on-shelf availability of products. Makro also enjoyed a thirty percent out-of-stock reduction. In order to expand their collaboration, they engaged a 3PL, Hays Logistics (now part of Kuehne & Nagel) to operate a shared distribution center and handle transportation on their behalf. They persuaded the retailers to order both Unilever and Kimberly-Clark products on the same day so that the products can arrive together on the same truck at the stores. Kimberly-Clark and Unilever processed their own customer orders and then relayed that information to Hays Logistics, who then used that information to pull both companies' products from the warehouse and assemble full-truckloads for shipment. As of 2011, Kimberly-Clark and Unilever now share 127 customers and eighty percent of their deliveries are through their shared supply chain. Sales from these

shared efforts also account for ninety-three percent of Kimberly-Clark's revenue in the Netherlands (Cooke). Other manufacturers, which were also customers of Hays Logistics, have started using the same distribution center so that the 3PL can be more flexible in the case that Kimberly-Clark and Unilever products alone could not fill a full-truckload.

It took a few years before Kimberly-Clark started similar collaborations in other European countries because the process of seeking a qualified partner is not a simple one. "The right partner is not just somebody with the right volumes. It's also [a matter of] finding a company with the right culture- somebody you can work with, somebody you actually trust," says Peter Surtrees, Kimberly-Clark's director of supply chain in Europe (Cooke). Eventually, in 2006 Kimberly-Clark partnered with Kellogg Company in parts of Great Britain and Scotland. Kimberly-Clark operates distribution centers in north and south Great Britain and Kellogg's manufacturing facility was located in the North. During their test run, Kellogg shipped to a Kimberly-Clark distribution facility in Northfleet (east of London) and the products were cross-docked and mixed in with Kimberly-Clark's goods. Both companies' products were then loaded on to a truck for delivery to small customers in London and Southeast Great Britain. The trial was so successful that it became a permanent arrangement. Kellogg now reciprocates for Kimberly-Clark's deliveries in central Great Britain. Kimberly-Clark stores it products in Kellogg's distribution facility in Trafford Park (near Manchester) and the products are assembled into full-truckloads to small retailers in the region. Similar strategies were employed in France when Kimberly-Clark and Kellogg collaborated with Carrefour. Even though the companies contracted with different 3PLs to run their distribution centers, the facilities were located near one another in Orleans, so a single truck from the French 3PL, Norbert Den could stop at both

facilities and ship full-truckloads to Carrefour. Carrefour was able to achieve its goals of reducing cycle time and store inventory levels.

So much interest had blossomed due to the incredible successes by these companies that several hundred more manufactures, retailers, and logistics service companies now belong to the European Logistics Users, Providers, and Enablers Group (ELUPEG), which like VICS, was formed to champion collaborative supply chains.

Collaborative Warehousing

Collaborative warehousing processes are best practiced hand-in-hand with collaborative transportation management, as inferred from Kimberly-Clark's partnership with Unilever. In the Netherlands, the companies operated a joint distribution center and this enabled them to enjoy the benefits of shipping full-truckloads of products simultaneously. Referred to as horizontal collaboration, this approach is characterized by manufacturers, often in the same industry, sharing supply chain assets for mutual benefits. It is collaboration across rather than along the supply chain. As mentioned above, Hershey Co. and the Ferrero Group in North America had already demonstrated exceptional results collaborating in transportation, but in addition, the two companies announced plans to extend their collaborative efforts even further into warehousing as well. The *North American Horizontal Collaboration in the Supply Chain Report- 2011* notes that while such collaborative efforts are well underway in Europe, the concept is still in the early stages in US supply chains, 'but the benefits are clearly recognized and there are companies which have already optimized their supply chains with this cutting-edge strategy" (Siegfried 20)

"Businesses that begin a horizontal collaboration effort often focus initially on transportation because it is the low-hanging fruit," says Chris Saynor, Eyefortransport CEO (Siegfried 20). However, collaboration should not be limited to transportation. The ideal horizontal collaboration business model reinvests those savings from transportation into a deeper level of collaboration. These deeper horizontal supply chain collaborations extend into sharing warehousing, distribution, and manufacturing capabilities (Siegfried 20).

While larger manufacturers and retailers may see the greatest benefits from collaborative initiatives such as CPFR and CTM, small and medium-sized consumer packaged goods manufacturers may actually benefit more from collaborative warehousing practices. This is because they have an extensive network of retailers, from small convenience stores to big box outlets. Currently, most store their goods in a company-run or third-party warehouse, ready to be sent as needed to the retailer's distribution center, or direct to the store. Most often, because almost no store or distribution center is large enough to need an entire truckload of their products, these shipments move as less-than-truckload freight, which costs more per pound of freight than a full-truckload. As a result, the trucks making those deliveries are not utilizing their full capacity, thus making the trip inefficient for everyone and passing along those additional costs to the rest of the supply chain.

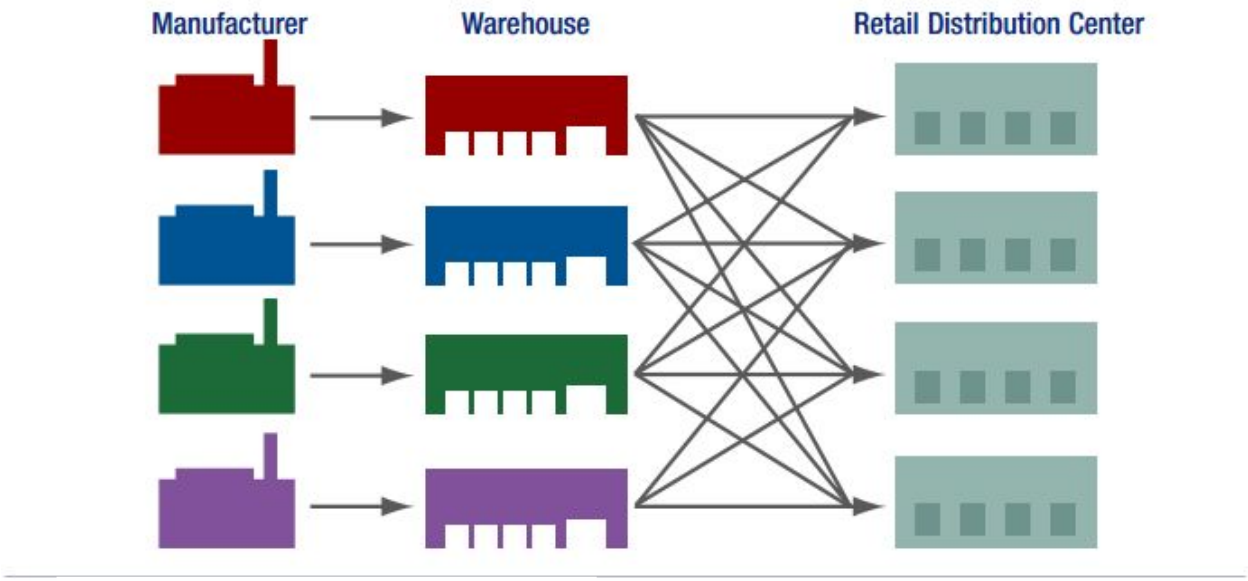

Figure 3. Standard distribution networks

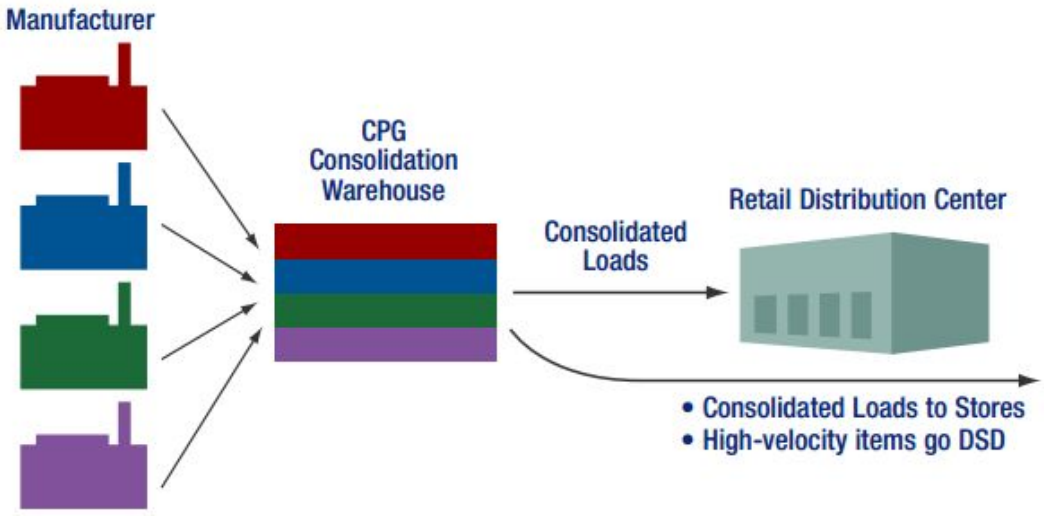

Figure 4. Distribution network after consolidation

Under the current arrangement depicted in Figure 3 (Kane 6), each supplier is interested only in its own line of supply to the retailer, but under the new model proposed in Figure 4 (Kane 7) focuses on increasing the efficiency of warehousing as well as transportation. Not only would different loads destined for the same end point be consolidated in order to maximize trucking

efficiency, the collaboration would begin further back up the supply chain so that loads could be consolidated as early and as often as possible. Logistics managers would work with their 3PLs to decide how to best transport and store goods prior to picking and packing so the interests of the whole range of suppliers – not just a single supplier- were best served.

Third party logistics providers play a critical role in this form of collaboration, more so than in CPFR or CTM, where most of the responsibility and effort lies with the partnering companies. The 3PLs adopt new roles as warehousing and freight managers in this new collaborative model. This collaboration scenario is most likely to succeed if a third party coordinates the consolidation of orders and deliveries. Whereas individual manufacturers have been known to collaborate with rivals on their own, there is an advantage when the collaboration is fostered by a neutral third party that rivals can trust.

As the 3PLs build and run warehouses, they must do so with the idea of collaboration in mind. The warehouse space must be easily adaptable to use by multiple suppliers, all of whom are subject to seasonal demands. They must also figure out the details of shipping the orders, such as what pallet and cube size any given retailer prefers, and ship all deliveries to the retailer's specifications, no matter how they arrive from the manufacturer.

According to ES3's details on their Direct-to-Store (D2SSM) program, which provides a shared, collaborative warehouse for manufacturers and retailers, this solution reduced supply chain costs by thirty percent improves speed-to-shelf, increases on-shelf availability, and reduces supply chain carbon usages by more than fifty percent. This model has proven to produce quantifiable results (Baker).

The Future of Collaboration

In 2008, *The 2018 Future Value Chain Report* was jointly published by researchers at the Global Commerce Initiative, Capgemini Consulting, Hewlett-Packard, and SAP AG. Building on the series of *Future Value and Supply Chain* research reports, this one examines the changing dynamics that will impact consumer behavior and how supply chains will evolve in response to these changes. The studies involved conducting workshops with participants in the consumer products industry from Europe, North America, and Asia including China, India, and Japan. What was concluded from this research was that in ten years, the balance of economic power will have shifted at both the consumer and the corporate levels. The growing middle classes in Asia and the mass adoption of consumer technologies worldwide will drive new communication and purchasing patterns. The changing costs and decreased availability of natural raw materials will affect all supply chains, and there will be heavier emphasis on environmental and socially sustainable ways of sourcing materials. All findings from the research and other trends highlighted in the report underline the need for greater collaboration between all parties in the supply chain including greater information sharing enabled by continued advancements in technology, collaborative warehousing, collaborative city distribution, and collaborative non-urban distribution (Mollart 14).

Conclusion

Many firms have engaged in collaborations over the last decade, and there are quite a few very successful ones including those that were examined in detail throughout the paper. However, not all collaborative initiatives have been as successful. Buyer supplier collaborations can require

significant investment in time and money. A better understanding of the elements required for effective collaboration can aid managers in raising the likelihood for success.

Senior management must recognize the potential value of a true collaboration and must be willing to commit the time and resources in developing a deep understanding of their supply chain partners in terms of their business processes, objectives, culture, and value they provide to their customers. Gaining an understanding of these elements early on will help make the partnership easier. This will help the firm choose the most qualifying partners whom align with their own business objectives and can get along well from a cultural standpoint.

Because piloting such collaborative projects are challenging and require substantial amounts of time and labor, many firms are hesitant to invest in them. Trust is also an issue, especially when considering a collaborative project with a competitor. However, the advantages from sharing resources do in fact translate into tangible benefits for all parties involved. Firms must learn to set aside traditional conservative attitudes and be willing to openly share their information and knowledge with their partners. The most successful cases of a high level of collaboration have resulted from a strong mutual commitment, open information sharing, and respect for one another's capabilities and leveraging those. Together, they are able to attain their individual business objectives at a higher level than they could have without working together.

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WORK EXPERIENCE

Walmart Logistics Grove City, OH
Private Fleet Operations Intern- Summer 2011

- Analyzed and recommended solutions to improve fleet efficiency by smoothing inbound volume imbalance
- Collaborated with Traffic Strategy team to develop strategy for multiple consolidation point synchronizations
- Designed and implemented sustainable process to improve asset utilization performance
- Trained associates to use new action plan to better manage trailer pools and trailer turn activity at vendor yards
- Improved trailer turn performance by 18% after two weeks of implementation, and achieved metric goal for the first time

3BG Marketing Solutions Philadelphia, PA
Public Relations Intern – Summer 2010

- Organized model casting and event advertising for Lingerie and Lashes Fashion Show project
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