

## Learning From Supply Chains: Hershey Foods and the Confectionary Industry

September 3, 2007

Fast moving products that have a short shelf life are an interesting supply chain to view closely. Generally, these product categories have low profit margins so volume is important. At the same time, an infrastructure of warehousing and distribution centers to efficiently move product is critical. With the poor performance of this connected material flow network, a company can create large unnecessary costs that will quickly limit the profit potential of the products they sell.

The Confectionary Industry is just one example where these problems have become a reality. The Confectionary Industry is commonly defined as sugar based snack items, such as chocolate, products that are readily available almost anywhere. If we start at the beginning of the supply chain though, we can see the real complexity of the material flow process. With many farmers of sugar and other ingredients and a large differentiated distribution network, the Confectionary Industry involves a large number of contributors all influencing a products cost. With so many handling and inventory storage points in the supply chain, it is easy to see how product profits can erode.

More specifically we will focus on one company's development of an internal and external distribution center network, which controls the product material flow throughout the system. Going from a disorganized fragmented supply chain network to a more controlled system was certainly a challenge, but Hershey Foods, Inc. found a way. The company not only improved their revenue generation, but also the cost structure impacting profitability.

### Introduction to the Confectionary Industry

Around the world, the Confectionary Industry is still rapidly developing, although if we look at specific examples such as the US, we see the market is fairly well matured. In many cases, the Confectionary Industry started like many others, with a large number of small manufacturers and distributors, all selling their own candies. Large scale consolidation occurred between 1960-1990, which marked the growth of mega-corporations in the food industry segment. This expansionary period created large distribution networks around the world, as well as the early development of growing supply chains.

In 2006, the global market for confectionery products was roughly \$136 billion, having grown 5.1% from the year prior. Chocolate products make up about 54.2% of the market and sold over \$74 billion in 2006. In this year, the U.S. Confectionary Industry was \$27.9 billion, according to Packaged Facts. The market share for most confectionary product segments has remained relatively constant over the last 10 years.

Today, chocolate and other confectionary products are sold in a vast array of distribution channels. From vendors on the street to convenience stores, museums to vending machines, and large retailers as well, confectionary products are one thing that can be found almost anywhere. In 2006, roughly \$16 million in sales were attributed to retail outlets. In the US, Food, Drug and Mass retail (FDM) accounts for only 29.2% of retail sales. Nearly 43% of chocolate sales occur in the non-traditional channel such as smaller chocolate stores and through independent distribution.

The supply chain for confectionary products spans the globe and consists of literally thousands of contributors. Chocolate products for example start with sugar, cocoa and milk

production from farms located around the world. These raw materials are then sent through distribution agents to large scale manufacturing facilities, which refine the material and send it on to product manufacturing. High profile brand management companies then combine these materials to make their delicious snacks and commonly hold product in warehouses to satisfy demand for the multitude of retailers that exist. This material movement takes a strong level of coordination to ensure customers have chocolate when they want it. As margins are low, volume sales are key.

In the Confectionary Industry, there are only a small number of large companies that have emerged to become market leaders. One company is Hershey Foods Inc., which has a long history of development and whom some even credit with the creation of the chocolate industry itself. As a large global player, coordinating the supply chain and building a strong distribution network has been the underlying factor allowing the entire system to operate efficiently. We will consider this model more closely, and specifically look at the changes in the company's distribution network that helped build stronger material and information flows. As a result, these developments have significantly improved the companies overall profitability.

### **Hershey Foods Inc.**

Hershey Foods, Inc. was founded in 1894 and is based in Hershey, Pennsylvania, USA. The company is primarily involved in the manufacturing, marketing, distribution, and sale of various types of chocolate and confectionery, refreshment and snack products, and food and beverage enhancers in the United States and internationally. The Hershey Company sells its products through sales representatives and food brokers, primarily to wholesale distributors, chain grocery stores, mass merchandisers, chain drug stores, vending companies, wholesale clubs, convenience stores, department stores, and natural food stores.

When the company began, Hershey brought to market a low-cost, high quality product. These were the factors that distinguished the company for years. The founder, Milton Hershey, even concluded that large scale advertising wasn't necessary because it was the quality of the product that drove sales. For over 70 years, the company didn't use mainstream advertising.

The company did however realize the importance of downstream material process flow as a global supply chain was evident even from the beginning. The original location of the Hershey factory was near local ports. This helped the company purchase and transport sugar and cocoa beans from overseas farmers. The third ingredient is milk, which was supplied by many local farmers in surrounding areas close to the primary manufacturing facility.

As time has gone on, Hershey has grown to become a global leader in the Confectionary Industry. Many companies have diversified into a number of food product segments, and although Hershey did this briefly, they sold off these businesses to focus on their core, chocolate. In doing this, they have created a specific strategy that emphasizes the importance of material flow for the products they do sell, and at the same time generate the highest profits on these goods. Here is a quick look at Hershey Foods compared to their competition.

	<b>Hershey Foods Inc.</b>	<b>Cadbury Schweppes PLC</b>	<b>ConAgra Foods Inc.</b>
Total Revenue (\$ Million)	\$4,994	\$14,981	\$12,028
Sales Growth Rate	1.3%	-17.7%	4.8%
Cost of Goods Sold (\$ Million)	\$3,077	\$7,401	\$8,890
Gross Margin	35.72%	9.3%	26.09%
Operating Margin	16.16%	6.03%	8.36%
Profit Margin	8.79%	1.51%	5.69%
Return on Assets	10.16%	0.72%	5.75%
Inventory Turnover	3.81%	5.99%	3.97%
Receivables Turnover	13.26%	4.82%	10.1%

The above table shows the clear position Hershey Foods, Inc. enjoys in the Confectionary Industry. Competitors such as Cadbury Schweppes and ConAgra Foods have large product portfolios spanning many diversified segments, and hence large overall revenues. When we consider the business measurements such as operating and profit margin generated by Hershey, the company is clearly able to do more with less. Hershey also has a very strong return on assets (ROA), again showing that the assets managed produce higher levels of revenue when compared to their competition. Although, the inventory turnover for the company is slightly lower, in this industry having product on-hand is important to ensuring demand is met. Maximizing the volume of sales is critical because the profit margin per product is low. To realize these strong industry metrics, Hershey Foods, Inc. has continued to develop its supply chain management capabilities and produced a material flow to improve profit generation for the company. With the highest margin in the industry, this means big money for continued development.

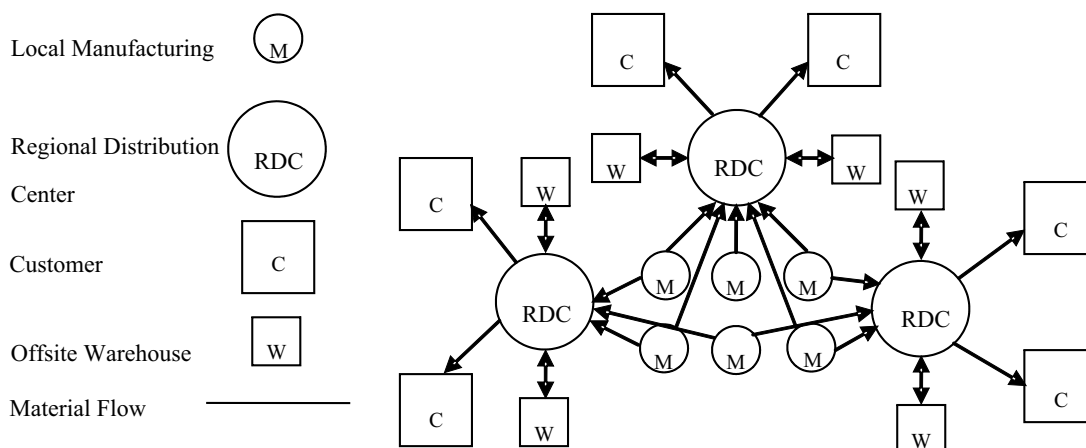
### **Hershey Foods, Inc. Supply Chain Model**

To better understand Hershey Foods current position, we must take a closer look at the old supply chain model the company used. Roughly 10-15 years ago, Hershey Foods was in a much different position. The company's ability to react to changing industry developments and customer requirements created large scale challenges, which slowed material movement. The costs of these delays negatively impacted the profitability of the company, and as a result,

shareholders started to withdraw their investments.

One issue the company could not handle were large volume increases in product movement through their distribution centers. Throughout the 1990's, Hershey had experienced strong growth. This was both for existing and new products. Added to this internal volume was the acquisition in 1996 of Leaf Candy Co. With the addition of this business, Hershey added \$450 million in sales and 1,300 SKUs. Integrating the two supply chains was a difficult task, and put large pressures on already strained material movement. At the time, Hershey decided to close all the Leaf Candy distribution centers and coordinated the new product lines through their own facilities. The problem however, is Hershey failed to make any changes to their existing network. Now the new products were utilizing valuable warehouse space and system capacity, which Hershey simply hadn't accounted for.

To provide a solution, Hershey created overflow distribution centers or local warehousing to account for the volume increase. The company either purchased new facilities to adjust for the volume, or in many cases rented temporary space as a short-term strategy. This created operational inefficiencies as the new facilities were not integrated in the system, and merely acted as independent carriers for products specific to a region. In this system, many redundancies were created in the material flow and the company failed to look for a more complete strategy to integrate the entire network. This added to the costs incurred and reduced already low profit margins on the product. What grew out of these decisions was a distribution network of many smaller distribution centers and warehouses that operated independently and importantly only looked at the individual cost contributed. Here is what the old model looked like:



Hershey had opened six additional facilities in just one region to store overflow inventory and used space in some manufacturing plants as well. As David E. Menicheschi explains, “We ended up shuttling product back and forth between the annexes and the distribution centers.” Here the costs are specific to transportation in moving product, as well as the impact storing inventory at a manufacturing facility can have to existing operations. In one example, Menicheschi describes holding areas near the outbound transit location where product would remain waiting for the trucks to pick up. This location in a distribution center is very valuable for fast moving products, so the cost incurred were well beyond just the holding costs

themselves.

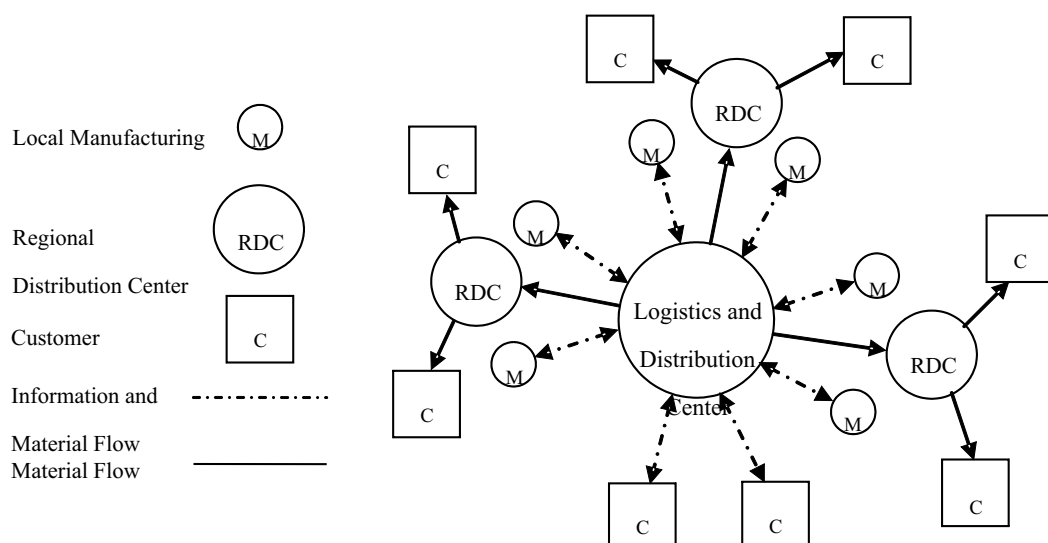
As the problems with inventory and material management increased, further costs were created by late or incomplete orders. Generally, when product flows are not coordinated effectively, we see this because companies are not able to account for inventory, ensure it is in the right location or ready to be shipped. When product orders arrive late or are incomplete, a company not only faces these costs, but also the negative affects it has on customer satisfaction. Hershey's distribution supply chain was creating significant affects that could severely impact the company over time.

Yet another problem Hershey faced was the integration of SAP into the entire model. Combined with product movement challenges, Hershey simply was not able to implement SAP to function properly in the system. As large scale software development takes resources of time and capital, Hershey was unable to devote the necessary people to both learn and implement new material management processes, and build a physical model that could support such large inventory volumes. Software can be an enabler for improved material movement, but importantly an efficient model must exist first.

In looking at the entire Hershey model, we can see like many supply chain models that the real challenge came from not being flexible. Many of the changes Hershey implemented during this time were reactive to the volume increases and changes to the industry environment. These decisions were made based on immediate need, and not by some systematic strategy that could ensure the same problems would not occur in the future. This takes building a more flexible system, and it is here where Hershey changed their entire supply chain model.

### The New Model

The center of the new supply chain model is an 111,480 square-meter distribution center, near the company's headquarters in Hershey, Pa. This facility was expected to manage over 713 million kilograms of product per year. What the company realized was a more controlled model was needed. In a better operating system, product would originate from the manufacturer and move to a more centralized location where customer orders could be directly fulfilled. In some cases smaller quantities could move to regional location to more readily serve replenishment. Here is what the new model looked like:



The first step to reorganizing material movements was to closely analyze the customer demand data received. To begin, Hershey started with some of their largest customers such as Target, Wal-Mart and CVS. What the company looked at closely was not just historical data, but also expectations in areas such as delivery time, quantity, and how the product should be delivered, for example in-transit stacking. This process also included a more fully developed integration into customer customized software. Also, as chocolate has a seasonal demand based on holidays, large order quantities during the year had to be accounted for and anticipated. For Hershey, this information was vitally important to understand what the customer required and then how best to setup their new distribution arrangement.

Once customer data was more thoroughly evaluated, the new distribution center was brought online and the company began reducing the total distribution network by eliminating unneeded resources. Since material flow costs can be looked at in terms of handling costs, a system for direct movement between the manufacturing facility and the customer was created. The cost savings from eliminating the fragmented small distribution center network were large. These savings were reinvested to further improve the operations and flexibility of the system.

At the same time, it was acknowledged that a single management team would be created to oversee the central supply chain for Hershey. Developing a material process strategy is the core focus of supply chain planning, and therefore a diverse team incorporating talent from the marketing, logistics, planning, and manufacturing side was important. “We needed to look at growth projections, the number of SKUs we would be handling, the way pallet configurations were likely to change, and what customers would expect from us with regard to cross-docking and modules and customization and store-ready issues,” says Menicheschi. “We then had to figure out what we needed to do in terms of our network and distribution facilities to support that vision.”

To address the question of time in delivery, Hershey looked closely at reducing the cycle time. In the old model, the product may have been manufactured to account for future demand, yet inventory management and logistics lengthened the delivery time significantly. In a make-to-stock model, buffer stock is specifically prepared to reduce this problem, yet coordination in material movement is key. In the new model, the new central distribution center actually cut Hershey's order-cycle time in half. By improving inventory accuracy, now at 99.96%, and creating a more transparent system for inventory monitoring, the company could increase the service level with better order fulfillment. This is not easy in such a large facility with 165,000 palleted products. This also took a more coordinated effort with 3PL partners, although when inventory management is improved, this coordination can operate much more smoothly.

One of the last stages to improving product demand fulfillment and profitability for the company was to focus on fast moving product in-store display packing. For many Hershey products, the company uses in-store displays to influence customer impulse buying. These are the people at the checkout line who see chocolate and have to have it. In the old model, the in-store display was shipped separately from the product to a partner who would create the in-store display. Once complete, the display would be shipped back to Hershey and on to the customer. In the new model, displays are packed at the distribution center and replenishment occurs as needed since product is already on-hand. Hershey created five specific selling and shipping zones in the central distribution center to fulfill orders in 24 to 48 hours. “Our goal was to improve cycle time from a very poor 10-plus days to a cycle time of five to seven days



from receipt of order to delivery,” says Menicheschi.

Overall, Hershey has realized significant cost savings based on the new model. From reducing transportation, fixed asset, and inventory holding costs, to reduced time and improved customer service, the company has made a dramatic turnaround. Much of this improvement is based on a more complete understanding of the company's true focus and capabilities. As Ken Miesemer, Director of Distribution explains, “Our expertise is in manufacturing and marketing.” In the old model, the company had to focus much of their attention on logistics management because of complexity in having so many small distribution centers and warehouses. In the new system, Hershey focuses on manufacturing, marketing and supply chain management, outsourcing other functions such as warehouse and logistics management to companies whose strength is these capabilities. We will now turn our attention to discuss how they did it.

### **Building a Distribution Center Network**

At the core of Hershey's dramatic improvement is a fundamental change in the distribution center network. Linking this complex network was definitely a large undertaking, but one that was necessary for improved material and informational flow. With a large central distribution center complete, another 55,740 square-meter facility was built to serve the Southeast region of the US. Further improvements were also made on a Northwest location and additional distribution centers were in planning for the middle of the US and the Southwest. In total, the new network eliminates many of the smaller facilities once used, creating both a more centralized and controlled system with lower risks overall.

Software was one tool used to manage material and information flows. The new system works in this way. First, the order is received by SAP either from a customer EDI transmission or a field sales representative. For orders that are free from errors, SAP books the cleared orders, allocates the inventory based on availability and in-stock levels, issues a delivery note for cleared orders and sends a note to 3PL partners for transportation.

Another effective use in software is order bundling. As individual customers send purchase orders, the software used can track delivery request dates to combine orders for shipping. This importantly is directly connected to all 3PL providers, so transportation requirements can be identified and trucks can be scheduled. A 3PL provider can either choose to accept or decline the shipment, whereby others are offered the opportunity. In the case of Hershey, 96% of orders are accepted because they are such a strong customer. Once the logistics of shipping are determined, the order passes on to the distribution center and is assigned to a picker, with the specific route for picking already determined. After the order is assembled, the system is notified again, where an invoice and shipping documents are prepared. The 3PL also receives an electronic transmission that the product is ready to be shipped.

In this system, 3PL management is essential to ensure efficient transportation and shipping. To create the optimized solution, Hershey works with 3PL providers willing to dedicate an onsite team to their operations. When there is a problem, the 3PL can immediately address the situation. If a shipment needs express shipping, the 3PL can work with their own team to providing transportation. At the same time, new solutions can be created to further improve material flow. The 3PL is closely integrated into the process on a day-to-day basis.

From an internal perspective, the reorganization of the distribution center layout and operating areas was also an important change. For example, one development was moving

from pick-to-order to making batch picks. In the old model, pickers would create a shipment based on the order received from the customer. Each new order would need a picker to identify every product required to finish an order. In the new model, pickers are assigned to a specific set of products. In this case, the picker only focuses on those orders that require the products they are responsible for. To further improve this system, Hershey also improved the slotting of products in the building.

Under the new design, the company created zone storage spread around the building. Within each zone product are specifically categorized and slotted accordingly. The company has categories for fast, medium and slow movers. In this case a product can be accessed from many different points in the distribution center. Fast moving product is located closest to the shipping dock. Hershey also considers the common pallet arrangement for a given product. Partial palleted products are slotted closer to picking stations.

The company also has transitioned from a traditional first in/first out (FIFO) model to a system based on expiration date. Because the products Hershey produces are perishable, it is critical to move products that may expire sooner, closer to the shipping areas. This also has an effect on seasonal products, which are slotted in particular locations based on the proximity to the holiday they are made for. Lastly, racking inventory is based on weight. Higher areas are designed for low weight products, and lower areas are reserved for higher weight products. This alone has helped the company save on battery power and costs for the fork lifts.

As flexibility was important, Hershey made the new distribution center able to manage a dynamic environment for product changes. In the distribution center, roughly 800 storage placements are specific to a product that do not change and another 800 can be changed dynamically. This flexibility allows for re-slotting of variable positions every day if needed. The placement for more stable products are re-assigned roughly every two weeks. What this model creates is the ability to manage the distribution center according to product demand. In higher demand times, product can be moved closer to the shipping area, in low demand times, farther away. With new product introductions, product can stay close to the shipping area during the initial marketing push, but flexibility allows for the product to move if demand should become lower over time.

In total, this massive distribution center utilizes 160 dock doors and 650 employees. The number of doors allows the company to prepare orders in advance near doors that are not being used at the time. According to the management, the common system has three days of orders already prepared for assembly. This makes Hershey flexible in order assembly and advance preparation to ensure shipments are properly put together and ready for shipment. At the same time, all the employees are trained in both warehouse operations and picking. This gives Hershey the ability to utilize staffing needs most efficiently.

What is interesting to note in looking at the entire redevelopment of Hershey's supply chain and distribution center network is that where the company reorganized, Hershey focused on limiting the use of automation unless it was necessary. The strategy, planning, and implementation importantly focused directly on the material and information flow processes to create a better model. We see this as critical to not only understanding the operations, but also in creating a successful outcome.

Seeing the entire supply chain model is critical to improving material process flow. We often comment on supply chain software in this regard, because although a software package may claim to address the entire supply chain, how many really do consider the entire process



flow, from raw materials all the way to the customer? Hershey's development shows the importance of viewing the product and the people that manage its movement. Software can be an important tool, however, rarely does it actually improve the entire system. More commonly it considers only a few factors in the operational process.

As the confectionary industry continues to develop, we will see much more emphasis on supply chains to ensure customer demand is fulfilled on-time, and replenishment operations ensure that product is where it belongs, making money on the shelf. At the same time, upstream components such as retail location and inventory management will develop further to improve this process, and downstream raw material operational development will only strengthen the entire supply chain. This of course will take time, although as companies increasingly realize the importance of protecting profit margins, we see that the industry as a whole will coordinate itself more effectively. This is all to ensure that sweet chocolate is there when you want it.

---

<sup>1</sup> *The US Market for Chocolate*. Packaged Facts. Rockville, Maryland: September 2007.

<sup>2</sup> Hoffman, Kurt C., "Hershey Kisses Its Supply-chain Inefficiency Good-bye?".

<sup>3</sup> Ibid.

<sup>4</sup> Ibid.

<sup>5</sup> Ibid.

considering supply chain cost reductions and improved operational effectiveness, which may pave the way to industry advantages in the future.

---

<sup>1</sup> Parker, Philip M., Ph.D., *The World Market for Furniture and Furniture Parts: A 2003 Global Trade Perspective*, The Icon Group, Ltd., San Diego:2003, p.14.