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NEW SUPPLY CHAIN DIMENSIONS OF AN INDIAN COMPANY : A CASE STUDY

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Abstract

It is a known fact that the increasing uncertainty of supply networks, globalization of businesses, proliferation of product variety and shortening of product life cycles have forced Indian organizations to look beyond their four walls for collaboration with supply chain partners. With a gross domestic product (GDP) of over US$474.3 billion, the Indian industry spends 14 percent of its GDP on logistics. Considering this scenario, it is necessary to study the supply chain practices being followed by the Indian industry and to suggest areas for improving the same. Globalization has brought in revolutionary changes in the mind set of Indian marketers. This paper emphasizes the cost efficient supply chains through competitor comparison and its achievements in learning this direction. Also it focuses on how this company under study has successfully survived in spite of excessive competition in and around Tamil Nadu and other parts of the country.

Keywords: Value Network, Supply Chain Management (SCM); Cross-docking; Vehicle routing EOQ and Logistics.

1. Introduction

One of the most important factors in implementing supply chain management is to efficiently control the physical flow of the supply chain. Due to its importance, many companies are trying to develop efficient methods to increase customer satisfaction and reduce costs. In various methods, cross-docking is considered a good method to reduce inventory and improve responsiveness to various customer demands. However, previous studies have dealt mostly with the conceptual advantages of cross-docking or actual issues from the strategic viewpoint. It is also necessary, however, to consider cross-docking from an operational viewpoint in order to find the optimal vehicle routing schedule.

Recently, many companies are being required to satisfy more complicated customer demands. Thus, many companies are trying to obtain a high level of agility, flexibility, and reliability for various demands. However, operations of a single company have a limit on providing customer satisfaction because operations of a single company can have an adverse effect on those of the other companies in the supply chain. For that reason, supply chain management is attractive to many companies looking towards efficiently improving customer satisfaction.

Apte and Viswanathan (2000) mentioned that 30% of cost is incurred in the distribution process. Therefore, improvement of the material flow through efficient management of the distribution process is considered an essential activity to increase customer satisfaction. Thus, many companies are investigating and developing methods to efficiently control their material flow. In a number of these methods, cross-docking is considered a good method to reduce inventory and improve customer satisfaction. After classification according to product destination in the cross-dock, products are moved from the cross-dock to their respective destinations. This material flow in which cross-docking is implemented is illustrated in **Fig. 1.**

Two key points of cross-docking are simultaneous arrival and consolidation. In Fig. 1, all vehicles from suppliers arrive at the cross-dock simultaneously. If all vehicles do not arrive at the cross-dock simultaneously, some vehicles

have to wait. Therefore, the timing for all vehicles in the pickup process has to be synchronized to reduce waiting time. According to the destination, all products are classified and loaded to each vehicle in the cross-dock. This is called consolidation. Then, all vehicles leave the cross-dock to distribute products to their destinations. If simultaneous arrival and consolidation can be easily accomplished in a supply chain's physical flow, all products can be moved from suppliers to customers without any interruption. Therefore, we can expect to reduce inventory level and lead-time for delivery. Generally, there is no inventory in the cross-dock. If stock-out occurs frequently due to demand fluctuation and limited cross-dock capacity, a cross-docking system cannot be operated. In this case, some inventory must be stored in warehouses to respond to the uncertainty of future demands. However, we can more accurately forecast demands if the demands for the products in question are stable. For this reason, we maintain that the cross-docking system is best suited for products whose demand is stable and whose unit stock-out cost is low.

2. Review of Literature

Therefore, we adopt the vehicle routing, together with cross-docking, to improve material flow in the supply chain. Although the importance of cross-docking in a supply chain is widely accepted among companies, studies related to vehicle routing scheduling, which consider the cross-docking system, have not yet been attempted in any significant number. Allen (2001) and Luton (2003) described the advantages of cross-docking. Apte and Viswanathan (2002) introduced cross-docking as one of the recent strategic and technological innovations in the management of a manufacturing supply chain. Recently, some studies treated actual issues of cross-docking from a strategic viewpoint. Jayaraman and Ross (2003) dealt with the PLOT (production, logistics, outbound, and transportation) design problem, which incorporates cross-docking into a supply chain environment.

In short, previous studies focused on the determination of optimal locations for cross-docks and allocation of vehicles. In this paper, we treat the vehicle routing scheduling problem with a cross-docking system from an operational viewpoint. Therefore, we review previous studies on various vehicle routing problems in supply chain management.

There are a number of studies which treat the vehicle routing problem in the supply chain. But there is a close relationship between the pickup and delivery problem and the vehicle routing problem in cross-docking. The VRPTW (Vehicle Routing Problem with Time Windows) can be especially helpful in treating the former problem because one key point is simultaneous arrival at the cross-dock. Mosheiov (1998) handled the pickup and delivery problem which is a kind of vehicle routing problem. He developed the mathematical model to minimize transportation cost and maximize the efficiency of vehicles. Afterwards, two heuristic algorithms were proposed to find a good solution in a reasonable amount of time. Barbarosoglu and Ozgur (1999) reported that optimal transportation planning with multiple delivery centers in the supply chain can be replaced with multiple sub-optimizations, which means the optimization of transportation planning with one delivery center because vehicles allocated to a certain distribution center take charge of an exclusive area.

Most studies focused on the advantages of cross-docking. Recently, there have been studies on actual issues of cross-docking to improve material flow in the supply chain. However, these studies mostly treated the network design problem, i.e., the determination of appropriate locations of cross-docks. These studies are included in the category of strategic planning. Operational issues such as detailed vehicle routing scheduling with cross-docks were not dealt with. However, the integration of cross-docking with vehicle routing scheduling is important because this problem can be common

in actual operations. This is why a model integrating cross-docking with vehicle routing scheduling is treated in this study.

3. The Case Study of Hatsun Milk Foods

This company was started in the early 1970s as a partnership firm, and ice creams was the first product it launched in the market under the brand name of ARUN. During those days, ice-cream business was considered risky, especially as this market targeted only upper class which constituted a miniscule of the population. However, this company soon became a stupendous success and it started an ice-cream revolution in peninsular India. Soon ARUN became a household name with 70 delightful flavors. The company also received ISO 9001: 2000 certification for its factory. All the Hatsun dairies together handled 16 lakh liters of milk in a day. In 2004-05, its turnover was Rs.453 crores and the company had production capacity of over 60 tonnes of milk ingredients—milk powders, dairy whiteners and anhydrous milk fat.

4. Product and Distribution Strategies

ARUN has had a growth rate of 30%, far ahead of industry growth rate of 12% and became South India's number one brand with 34% market share. The ice-cream business distributes delightful and affordable ice cream through 1,100 exclusive parlors (largest network in India) spread over peninsular India. Currently, the company is making inroads into the western Indian markets and has some ambitious surprises up its sleeve. To maintain a distinct identity for its ice-cream parlors, the company introduced a new décor which is uniform and elegant with classic furnishing. The company expects that this will help in popularizing the company as well as its products through enhancement of brand image. Now ARUN mini-parlors are also springing up in rural areas. Both parlors and mini-parlors get heavy promotional support.

Arokya, Komatha, Santosa and Delight are the 'fabulous four' milk brands marketed by the company. The company's distribution network not only covers all towns with population of 30,000 + in Tamil Nadu but also parts of Karnataka, Andhra Pradesh, Goa and Maharashtra. Arokya is India's first bacteria-clarified milk and is available through a network of over 2500 dealers. Komatha toned milk is readily accepted by consumers for its quality. Other Komatha products like butter, ghee, curd and khoa have also been immensely successful in urban and rural markets. Under a scheme launched in Chennai, the Department of Posts is selling Hatsun Agro Products' monthly milk coupons through its 44 post offices, and the company home delivers Arokya milk. The milk will be Re 1 a liter cheaper compared to other products. The company has six cold room distribution points which have been located strategically for quick distribution. In the milk segment, the company's distribution network consists of 150 wholesale distributors, about 10,000 dealers for Arokya and 850 district selling agents for Komatha milk. There are more than 1300 vehicles handling distribution.

5. Promotion and other Marketing Strategies

This company's marketing strategies have always been highly customer-centric, which is the primary reason for the company's phenomenal success. Sales promotion activities are conducted regularly for both the dealers ('Singapore Delight Contest' and 'Malaysian Delight Contest' and Sales Schemes) and customers (like 25% discount coupon on VGP Theme Park entry), which are supported with aggressive publicity.

In the advertising campaign in 2005, the company used animation and assigned a character to lick ice-cream flavor, with distinct characteristics. The message sent out was that flavors, like different family members, may smell different but essentially carry the same quality, goodness and value belonging to the ARUN ice-cream family. The brand has always been associated with strong family values and

therefore, the advertising campaign. Another interesting point to note is that ARUN ice-cream parlors are family hangouts unlike other parlors which are youth hangouts.

6. A Logistics Marvel

Hatsun has become a role model in the country for its logistics efficiency and supply chain management. The milk is purchased at more than 8,000 villages from 1.36 lakh farmers, processed and redistributed to 10,000 dealers in a single day. It is no mean achievement keeping in mind that milk is a perishable commodity and the quantity is nearly million liters of milk.

The Chennai-based company has set up a benchmark in logistics cost. The company uses more than 800 vehicles which carry milk to 32 chilling plants (spread over four states), transport it to dairy units for processing, packing and finally distributing it to dealers. The vehicles cover 1,82,000 kms every day, transporting milk at a cost of just about 67 paisa against Re 1 to Re 1.25 for others. In fact, in Tamil Nadu, it is even lower at 57 paisa, where the company deals in large volumes. The company is making an effort to bring down its logistics cost to 6.25% of its turnover (presently 7.25%). Since the dairy farms are dispersed, small vehicles are used for transporting the milk to the chilling centers (seven in Kancheepuram, fourteen in Salem, three in Bangalore, seven in Belgaum and two in Kolkata). The milk is carried to the dairy plants at Kancheepuram, Salem, Bangalore, Belgaum and Kolkata from the chilling centers in larger vehicles due to large quantities. The size of the tankers and transportation costs are depicted in **Table-1.**

The company has taken all the vehicles on contract, though only bare chassis are contracted and company supplies its own stainless steel tanks. This results in both cost and quality advantages as the cost of hire for the bare chassis is lower than for a fully fitted-out tank. High quality steel tanks (which are financed from banks at low interest rates due to Hatsun's high creditworthiness) are used to ensure milk quality. The larger vehicles also bring about a saving of about 25% on a liter of processed and raw milk.

The trucks, which operate at 87-98% capacity, are refrigerated as it helps in maintaining milk at low temperature during transport from chilling centers to the point of sale (intermediate depots have been done away with to improve quality). The Hatsun fleet includes over 60 fifteen ton tankers, 32 nine ton tankers and containers, and a multitude of vehicles of different capacities from seven tonnes to the three-wheeled one ton carriers. The company is planning to install Global Positioning Systems in the larger tankers to track their movement for efficiency of operation.

7. Automation

Similar problems occurred in areas where manual entries and calculation play vital roles such as parameter-level checking, adjustments, producer bill and distributor bill generation. The only solution possible was automation. Pinnacle Software System (P) Limited was asked to automate the entire process in early 1999. The differences in quality parameters from various centers with the factory ones are now sorted by scan sheet automation process with automatic weighing and lab test comparisons. The producer and distributor billing was also automated.

8. Conclusion

It is found that perishable goods like milk and milk products by Hatsun Foods Ltd are typical products with stable demands and low unit stock-out cost. It is necessary to quickly deliver these products to customers for freshness and because of the short period of circulation. Moreover, unit stock-out cost for these products is relatively low. Thus, these products are appropriate for delivery through cross-docking. The procurement and related processes other than the distributor dispatch and billing were previously done manually. Hatsun faced problems in many areas especially with

data mismatching and consumption of time and resource. The main problem found by company was that there were lot of differences in quality and quantity between collection center and factory. Cross-docking for both pickup and delivery processes is considered. The physical flow from the supplier to the cross-dock is called the pickup process. The core issue in the pickup process is simultaneous arrival at the cross-dock. Thus, vehicle routing and scheduling for simultaneous arrival is the key to success of Hatsun Foods Ltd. There is a wider scope for the academic research in this field. It would be better for considering more and more companies which are applying the cross-docking and vehicle routing to face the stiff competition from the domestic companies as well as to thwart the Global Level Distribution Strategies of several MNCs.

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Figure - 1 : The concept of Cross-docking

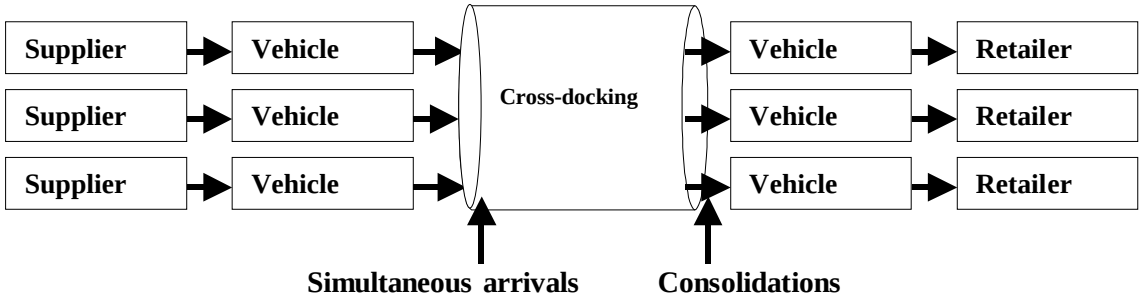

Table - 1 : Tanker Size-wise Transportation cost

S.No	Tanker size (in litres)	Transportation cost (Rs per km)
1	9,000	10.50
2	15,000	13.50
3	23,000	15.50