

# IMPLEMENTATION OF A CROSS DOCKING SYSTEM TO COCA COLA BEVERAGES SRI LANKA

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## Abstract

*The Coca Cola Beverages Sri Lanka Limited is a leading multinational carbonated soft drink manufacturer in Sri Lanka. It is involved in almost the entire supply chain process; from manufacturing to distribution. Therefore use of proper supply chain management practices is essential. Warehousing and distribution which is a main part of the supply chain plays a vital role in its operation. Since all the finished goods have to be delivered to distributors around the country, its transportation cost is considerably high. The aim of this research is to reduce transportation cost by implementing the supply chain management concept of cross docking. Secondary data collected from company records and systems were used for the analysis. The current transportation cost and the transportation cost through the cross docking center is calculated and analysed through a comparison. Then a cost benefit analysis is done to analyse the feasibility. Through the analysis it is concluded that it is feasible to use the concept of cross docking and many additional benefits which include time saving, better service levels and reduction of contribution to the carbon foot print. Finally recommendations are given to establish and carry out the cross docking operations.*

**Keywords:** Supply chain management, Cross docking, Distribution, Beverages, Reverse logistics

## 1. INTRODUCTION

Coca Cola, is said to be the second most popular word in the world. It is very difficult to find a person who doesn't know about coca cola. This famous product comes to the customers' hand as a result of a combination of number of companies or plants located all around the world. The Coca Cola Company involves in manufacturing of non-alcoholic carbonated soft drink. They are the world largest beverage company which supplies more than 500 products over more than 200 countries. It is recorded that the consumption rate of coke products is more than 1.8 billion servings per day. This led Coca Cola to become the most valued brand name in the world. The Coca Cola Company engages in franchise business. There are more than 200 bottling plants around the world and together with their bottling partners they have offered more than 700,000 job opportunities.

Coca Cola Beverages Sri Lanka Limited (CCBSL) is located in Tekkawatta, Biyagama. Currently it manufactures more than 50 varieties of coke products and sells over 10 million unit cases per annum.

## **1.1 Current distribution practices**

Concentrates are manufactured in the mother company and are distributed to all the bottling plants which are located around the world. Further the finished products should reach to the end consumer from those bottling plants. These distribution networks should be operated effectively for the success of the company. Therefore distribution can be considered as the integral part of coca cola's supply chain.

Every distribution strategy is not suitable for every country because of differences among them. Hence it is the responsibility of the management of a particular franchised partner to understand and implement the best strategy for their distribution. The Coca Cola Company has two major methods of distribution of their products to the customers. One is direct selling, where the finished products are directly delivered to the retail outlet. Other method is indirect selling, where the finished products are sold to distributors or agencies and they deliver those products within their territory. If the area which has to be covered by the particular bottling plant is less, then direct selling is effective, but if the territory they have to cover is wide spread the ideal solution is the second method. Almost all bottlers use the combination of these two strategies in their daily operations.

Coca Cola Beverages Sri Lankan Limited has two types of customers. One is called collection customers and other one is delivery customers. Collection customers have their own vehicles to collect their load. Delivery customers don't have their own trucks or lorries to collect their load. These customers are catered by company owned delivery trucks. Once the order is placed by the customer, a vehicle is arranged and delivered to that particular customer. Modern trades such as Mc Donald's, Cargills, Keells, Perera & Sons and schools are treated as delivery customers.

CCBSL has divided Sri Lanka into five regions namely West A, West B, South, Central and North & East for sales and operational efficiency. The transportation cost of drinks from the in-plant centralized warehouse which is situated in Biyagama to the particular distribution point is paid to the particular transport provider by the company. These payments are calculated according to specific rates which is called 'Mileage Master' or per case rate. The collection customers who send their own vehicles to collect their load of drinks are entitled to receive payments for transportation. Especially collection customers who come from faraway places to Colombo such as Jaffna, Kilinochchi, receive case incentives that other distributors aren't entitled to obtain. Paying transportation cost and offering case incentives to those distributors is a loss to the company. Therefore this unnecessary cost could be reduced. Further other additional benefits could be achieved.

## **1.2 The concept of cross docking**

"Cross docking is a logistics procedure where products from a supplier or manufacturing plant are distributed directly to a customer or retail chain with marginal to no handling or storage time. Cross docking takes place in a distribution docking terminal; usually consisting of trucks and dock doors on two (inbound and outbound) sides with minimal storage space. The name 'cross docking' explains the process of receiving products through an inbound dock and then transferring them across the dock to the outbound transportation dock (adaptalift, n.d.). Cross docking is an intermediate transit point where no or zero inventory is maintained. The goods are sent out to the cross docking point from the manufacturing plant or central warehouse, using delivery trucks and at the cross docking point, they are sorted and

rearranged and then loaded into the shipping trucks for delivery to distributors. By using this new supply chain concept, the transportation cost can be reduced and storage space can be reduced. This cross docking system is widely used by the companies in European and western countries. The best example is Wal-Mart which receives the maximum benefits from cross docking. Wal-Mart is the leader of the super market chain in the US. They can offer Everyday Low Price (EDLP) to their customers. The ability of offering such a big bonanza to their customers is achieved through cross docking. By implementing it, they were able to reduce their transportation cost and that saving is offered to their customers. Their outlets are linked with a centralized point. Therefore once a particular item is sold, from their outlet, that information is transferred to that centralized point. When the available stock is reached to certain point which is called re-order level or re-order point, full truck load of particular goods is sent to the cross docking point and shipping trucks from outlets come and collect their order. Not only the lowest price, but they have also achieved comparatively higher service levels through cross docking than their competitors.

This concept has been implemented to coke products in other countries such as the US. The tendency towards this concept by Asian countries is very low. Vietnam is the only Asian country that has implemented a cross docking system for distribution of coke products (Coke Magazine, n.d).

Therefore this study analyses the feasibility of implementing a cross docking system to CCBSL. By implementing this a considerable sum of saving and gain could be achieved. It will be a benefit to outperform other Asian countries which manufactures coke products.

### **1.3 Objectives of the study**

The objectives of the study were to identify the transportation cost under prevailing direct shipment system and the annual cost that the company has to bear due to distance incentives given to distributors from long distance areas, to identify the feasibility of using cross docking for distribution and to incorporate reverse logistics with the cross docking process.

## **2. LITERATURE REVIEW**

In global industrial context cross docking has been utilized efficiently as a means of reducing distribution cost and used as an efficient method of delivery of finished goods (Kulwiec, 2004) discusses different types of cross docking opportunities available in the supply chain. Further he describes when to apply cross docking and when not to apply cross docking. According to (Kulwiec, 2004), back-ordered items, seasonal (or promotional) goods, high-volume products in steady demand, high-value products, products having short lead times are suitable for cross docking. Further bulky, awkward items that are difficult to handle, items arriving before seasonal promotions begin, slow-moving items, low-value products, items purchased in large bulk quantities, products having long lead times are not generally suitable for cross docking. (Kulwiec, 2004) points out the availability of modern techniques available in the market such as Radio Frequency Identification Device (RFID) and bar code scanning that can be effectively applied for the cross docking operation. Integration of Information Technology based systems to the operations of cross docking derives a lot of opportunities such as avoiding out of stock situations, customer satisfaction, availability, service level etc. (Kulwiec, 2004). Reducing transportation cost is one of the main concerns in implementing cross docking system. (Wesche, 2012) addresses the impact on moving from traditional supply chain distribution to cross docking system. The study is based on two main aspects. One is to identify main factors that will change when moving to cross docking and interaction

among those factors under different circumstances. Secondly it focuses on the availability of the goods at the retail stores under different network configurations. It focuses on three types of distribution models, namely, Traditional Storage Distribution where retailers hold stocks at warehouses, Pre Allocated Cross docking (Pre C), where orders are allocated based on the demand at retailers and Post Allocated Cross Docking (Post C), where orders are allocated based on the demand at supplier.

(Vasiljevic, Stepanovic, & Manojlovic, 2013) shows the benefits that can be gained through cross docking by using a real world case study of a leading super market chain in Serbia. Distance travel, fuel consumption, time spend for touring, number of tours, number of pallets transported, vehicle maintenance cost, lease cost have been taken as indicators for the case study. Finally it shows the saving that can be derived by implementing the cross docking through cost analysis. Therefore this study too uses the cost benefit analysis method. (Saddle Creek Corporation, 2011), through the report of cross docking trend, discusses about the benefits that can be achieved from the cross docking concept. Improving service level, reducing transportation cost, consolidating shipments to the destinations, quick to market, reducing warehouse costs such as carrying cost, space cost are some of the benefits discussed. (Vis et al; 2008) discusses about the internal situation of the cross docking centre. It identifies the external factors that affect the operation of the cross docking centre; reliable supply with short lead time, availability of information through the entire supply chain, arriving and departing of products and trucks on time.

Therefore it can be seen that cross docking is a concept which has gained high interest in other countries but has not been focused much by research in Sri Lanka. Hence this study will assist to bridge this research gap.

Furthermore, cross docking and reverse logistics are two different concepts. Therefore cross docking associated with reverse logistics is quite a new concept. Most of the western countries engage in cross docking and reverse logistics separately, but not simultaneously. As a result of that there is lack of such knowledge and this research attempts to integrate both cross docking and reverse logistic part into one frame.

### **3. METHODOLOGY**

There are no companies of the same category who have implemented cross docking in their distribution strategy. Ceylon Breweries PLC has implemented cross docking for the distribution of their alcoholic products. Therefore relevant personnel from Ceylon Breweries PLC was interviewed to collect information to understand how they have implemented the cross docking concept and how benefits are derived. This research analyses the potentials of implementing cross docking system to CCBSL as a mean of reducing unnecessary loss. Implementation of cross docking system to West A and West B is unnecessary because all the distribution points in Western division are at close proximity to the central warehouse in Biyagama and to a certain extent the concept of cross docking is done. In Southern Region the number of distributors is less, therefore locating a cross docking point in an intermediate point is worthless (RTM Report 2013). Therefore the potential regions considered are the Northern, Eastern and Central divisions.

Secondary data was mainly used for the study which was obtained from organisational sources. First the scattering of distributors among these regions was identified through data available in Route To Market (RTM) Report. Data on all the distributors scattered in the

potential areas, current locations, geographical boundaries they have to operate, distance from the centralized warehouse (Biyagama) were obtained. It is necessary to collect the data regarding the transportation cost of each distributor, when transporting finished goods from Biyagama to their location and empties from their points to Biyagama (reverse logistics). These data was obtained from SAP and Haulage Invoices used by the logistics department. All transportation costs are borne by the company. Next data on the types of transporters used by the company and the basis of payment were obtained: some are paid monthly fixed amount, some of them are paid according to the number of cases they transport and some of them are paid according to a specific rates based on the distance they travel and the quantity they transport. There are few distributors from North, who have their own vehicles to collect their shipment and they are entitled to receive a case price incentive which others do not receive. This is because of the distance they have to travel. It is necessary to identify those distributors. This data was collected from 'Sales Report' of sales department. In order to implement the concept of cross docking, a cross docking point has to be constructed. Construction cost is a fixed cost, but it should be estimated by considering the current market cost of building such a facility. This estimated cost was obtained from a building contractor recommended by the Coca Cola Company. Next the 'Pre-implement cost' and 'Post-implement cost' were calculated. A Cost-Benefit Analysis was done to analyses in depth the benefits of implementing the concept of cross docking and the Pay Back Period and Net Profit Value (NPV) was calculated for the analysis.

## 4.FINDINGS AND DISCUSSION

### 4.1 Methods of payment

At present The Coca Cola Beverages Sri Lanka Limited involves In-Plant and centralized warehouse system. Therefore entire distribution is taken place from the centralized warehouse. For the purpose of delivering finished goods to particular destinations basically they use two types of trucks. One is rented trucks which are paid on monthly basis based on the capacity of the truck. Second type is normal delivery trucks which are paid based on Mileage Master which has been developed by The Coca Cola Beverages Sri Lanka by considering the fuel component, labour component and W&T (Wear and Tear) component. Normally labour and W&T components are considered as constant components.

### 4.2 Current cost and findings

This research analyzes the impacts of implementing a cross docking system for reducing distribution cost of central, north and east regions. Transportation cost is calculated according to the Mileage Master. The number of cases that is transported is multiplied by the particular rate given by the Mileage Master based on the distance travel. The summary of costs for year 2012 and 2013 is given in Table 1.

**Table 1. Summary of cost tracking before cross docking**

Region	Year	Cost (Rs)
Transportation cost for Central Region	2012	1,854,681
	2013	2,105,557
Transportation cost for North & Eastern Region	2012	10,537,274
	2013	10,847,918

The cross docking point is established in Galkulama in a 5 acre land owned by the company. The distances and the respective transportation cost from the proposed cross docking point (Galkulama) to each and every distribution points located in the Central and North & East regions was calculated. Then the distributors that can be served through the cross docking point were identified. As the distance to Galkulama from the company is not changing, the transport cost from company to cross docking point is constant. Therefore according to the current market rate, cost per case would be Rs. 40. This Rs.40 should be added to the cost per case from Galkulama to destination.

$$\text{Proposed Cost/case} = \text{Cost/case from Galkulama to Destination} + \text{Rs. 40} \quad (1)$$

As the next step, the current transportation cost per case to each distribution point is compared against the transportations cost per case via the proposed cross docking point. The summary of cost for the north, east and central regions are depicted in Table 2.

**Table 2. Summary of cost with cross docking**

Average cases per month	159,080
Transportation cost according to current Mileage Master	Rs. 11,504,501
Total transportation cost from Colombo to each destinations via Galkulama	Rs. 10,469,339
Expected Monthly saving	Rs. 1,035,162
Expected Annual saving	Rs. 12,421,944

Therefore overall a saving of Rs. 12,421,944 can be made by implementing the concept of cross docking.

In order to consider which customer should be exactly served through the cross docking point, the difference between the current cost per case and proposed cost per case has to be compared. If the difference is positive, they are the ideal customers who should be served through the proposed cross docking point. If the difference is negative, it shows that the current procedure is cost effective than the proposed method. According to that most of the distribution points in central region are not cost effective as most of them have negative differences. Therefore the proposed strategy is not suitable for distribution in the central region. For east and north regions most of the values are positive therefore the strategy is feasible. Sixteen distributors who can be served through the cross docking point has been identified and identified that the expected monthly saving is around one million rupees, therefore it is 12 million rupees per annum.

Next the cost benefit analysis is done by calculating the Net Present Value (NPV) and the profitability index. It is assumed that the to build a 75m long and 40m width fully facilitated cross docking platform with 8 dock doors (4 In-Doors and 4 Out-Doors), it will cost around Rs. 14 million according to current market rates. Therefore within one year and two months, company will be able to gain the invested money for establishing the cross docking point (assuming that the same and identical profit is gained every year). According to Central Bank, current bank loan interest rate is 16.5%. Based on that NPV is positive with a value of 13,669,880. The profitability index is 0.976. Therefore the strategy of using cross docking can be recommended to be implemented.

Reverse logistics can be done through the cross docking point. The empty glass bottles will be off loaded from the outbound trucks and then those trucks will be loaded with filled bottles. Then the empty bottles will be consolidated for larger shipments and transported to the main plant. When these empty glass bottles are received to the company, they are checked and monitored by security officers who work for the company. The defective bottles are rejected and deducted from the distributors. The security officer at the cross docking point will check and release the finished goods sent to the cross docking point and simultaneously receive the empty bottles after checking. Therefore checking and monitoring can be done at the cross docking point and the empty bottles can be transported to the company by the same truck which is used to deliver the finished goods to the cross docking point.

## 5. CONCLUSION

This research was conducted to analyze the implementation of the supply chain concept of cross docking to CCBSL distribution process with the purpose of reducing the distribution cost. It is recommended to implement cross docking system to serve North & East regions for the purpose of reducing distribution cost as discussed above. Also the NPV value being positive confirms the feasibility of it. Simultaneously it will help to enhance the service level and the availability of products in both regions. It reduces the unnecessary truck movements thus saving time and energy. Further it helps to reduce the carbon foot print. Additional it can be concluded that by concerning other facts which include the ease of access, truck waiting time, held-up cost, distributors in the Central and North & Eastern Regions can be selected to be served through the proposed cross docking point, though the difference in the cost per case between previous scenario and new scenario is negative. The reason is most of them are collection customers who send their own vehicles to collect their shipments. It is because when they come to Colombo to collect the shipment, they will have to waste more time and have to wait for longer time durations at the Coca Cola premises to receive their load which increase the holdup cost. Therefore it would be more advantageous to serve those customers via the proposed cross docking point.

Further research can be under taken to identify new locations which can serve as new cross docking points. The time saving and fuel saving of the strategy when used for the Central region can also be proposed as further research to be conducted. The type of cross docking to be used can also be recommended for further research.

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