

Various aspectsof Operation Managementofa Coca cola Producing Company in Bangladesh

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Abstract: This study investigates various aspects of operation management, such as, demand and forecast, production process, operation strategy and how to apply lean as well as 'Just-In-Time' theory to improve the operation system and performance objectives. It focuses on these aspects in relation to a specific case study based on activities of two companies, Abdul Monem Limited and Tabani Beverage Limited, who are producing soft drinks of "The Coca Cola Company".The information have been collected from both primary and secondary sources of data.The producing company need to differentiate products, size of bottle to expand market and reduce time of pre-processing stock inventory to maintain profit margin. The company may use water and rail road to decrease transportation cost and time. Further research is needed to improve the operation management of the Coca cola producing company in Bangladesh.

Key words: Demand, Forecast, Operation Management, Lean management.

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I. Introduction

The global food and agricultural industry was about \$7.8 trillion market or 10 percent of the world GDP (Food, Beverage and Grocery Business Trends Analysis, 2016) [1]. Beverage captured about 18 percent of total food and agro-industry market in 2015 (Jachim, Ricco, Cummins and Ewald, 2015) [2]. Both alcoholic and non-alcoholic drinks are included in the beverage. Coca Cola is one of the popular non-alcoholic drinks around the world since 19th Century.Asia-pacific is becoming a fastest growing market for the non-alcoholic drinks. In this region, Bangladesh is one of the populous country with lower middle income (World Bank, 2015) [3]. Due to change of lifestyle and increase of income, carbonated beverage, juice or flavoured drink and energy drinks are commonly found here. An insignificant number of studies have been conducted on the operation management system of the beverage producing companies.

II. Background Information

Eight companies are mainly marketing global and local brand of drinks like Coca Cola, Pepsi, Sprite, 7Up, Pran, Mojo etc. The company named Abdul Monem Limited and Tabani Beverage Limited are bottling and distributing Coca Cola Company's product in Bangladesh. These company are producing Coca Cola, Fanta and Sprite in glass, PET bottles and Can (Das 2014) [4]. The demand of these products are seasonal. "Fig 1" shows that both the companies produce the CSD in the following bottles and packs through a strong and expanded distribution channel.The first component of the distribution channel is the manufacturers who prepare syrup and bottles and the last component is the end users.

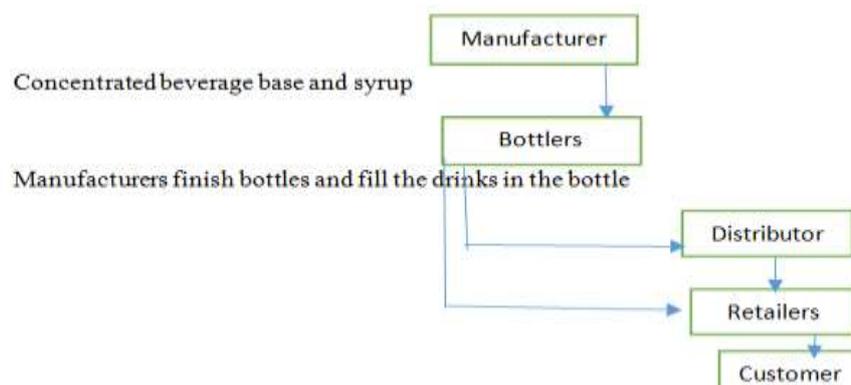


Figure 1: Distribution channel of Coca Cola in Bangladesh (Das, 2014)

The two companies distribute the product mainly through distributors and limited percentage through retailers. The network has been expanded even to the most remote areas of Bangladesh. “Table 1” shows that the both companies produce Coca Cola (normal and diet coke), Fanta and Sprite in PET bottle, RGB and can.

Table 1: Variety of drinks sold by the two companies

Bottle	Pack	Brand			
		Coca-Cola	Diet Coke	Sprite	Fanta
PET	500 ml	√	√	√	√
	1 L	√		√	√
	2 L	√		√	
RGB	175 ml	√		√	√
	200 ml	√		√	√
	250 ml	√		√	√
	1L				
Can	250 ml	√	√	√	√

Source: Report of Abdul Monem Limited (2015) and Report of Tabani Beverage Limited (2015)

III. Research objectives and method

The aim of the study are to see the demand and forecast pattern of Coca Cola in Bangladesh, to observe the production process and operation strategy in Bangladesh andto recommend how to apply lean as well as 'Just-In-Time' theory to improve the operation system. Mainly case study method has been used to conduct this study. Both primary and secondary sources of data were used. This study has been conducted with the coca cola bottling company named Abdul Monem Limited and Tabani Beverage Limited. The information about demand and forecast has been collected from both the companies but the information about production process, inventory management and distributing system have been collected from Abdul Monem Limited only. A special set of questionnaire has been developed to collect the relevant information. The information were collected by sending set of questionnaire through mail to the company authority and interviewing company personnel over telephone.

IV. Discussion

This section will focus on the details of demand and forecast, process type, manufacturing system, operation strategy, production process, water safety technology and inventory management of the brand Coca Cola in Bangladesh. This section starts with the demand and forecasting of soft drinks.

4.1 Demand and forecasting

Demand and forecasting are two important components for achieving success and maximizing profit. Any company will try to fulfil demand accurately and the demand is usually forecasted by the marketing people (Ramanathan and Muyldermans, 2010) [5]. The company will suffer if the prediction turns out to be wrong. The demand and forecasting pattern of soft drinks and the specific picture of Coca Cola is described below.

4.1.1 Demand

Ramanathan and Muyldermans (2010) [5] showed that the sale of soft drinks depends on weather and temperature, festivals and holiday periods and hence it is quite difficult, if not impossible, to control by the supply chain members. They represented actual demand/sale performance conceptually which is shown in “Fig. 2”.

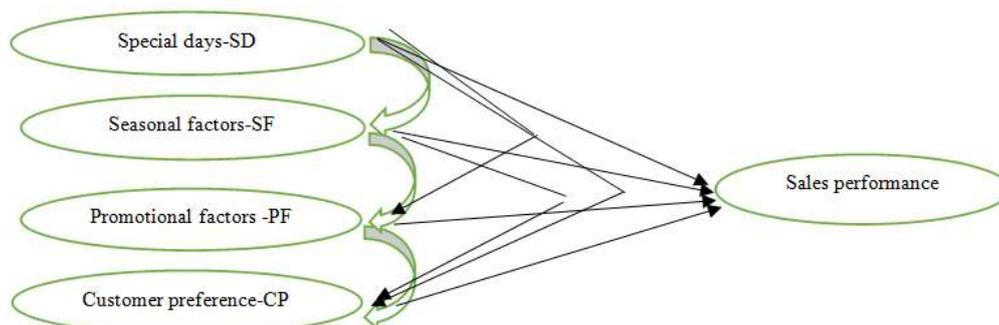


Figure 2: Conceptual demand structure of soft drinks (Ramanathan and Muyldermans, 2010)

They argued that sales performance of soft drinks depends on ‘promotional factors’ (PF), ‘special days’ (SD) - includes holiday periods and major festivals, ‘seasonal factors’ (SF) - includes temperature and weather and ‘customer preference’(CP) - includes preferences of customers and life cycle aspects (i.e., whether the product is an established product or a new product). The “Table 2” shows the relationship of PF, SF (Temperature), SD and CP with the sales volume of PET bottle (500 ml), RGB (250 ml) and Can (250 ml) of Coca Cola (Abdul Monem Limited 2015) [6].

Table 2: Significant Demand factors

Significant Factors	PET bottle (500 ml)	RGB (250 ml)	Can (250 ml)
Promotion Factors			
Types of Promotion	√ (+)	√ (+)	×
Percentage Discount	√ (+)	√ (+)	√ (+)
Seasonal Factors			
Temperature	√ (+)	√ (+)	×
Special Days			
Festivals(Eid/Puza/Christmas)	√ (+)	×	×
Other Holidays	√ (+)	×	×

The “Table 3” shows that types of promotion has positive impact only on the sales of PET bottle, whereas, percentage discount has positive impact on all the three types of bottles. During hot weather, people wants to buy PET bottle (500) and RGB (250), whereas during special days, sales of PET bottle (500 ml) increases. So, overall customers’ are inclined more towards buying PET bottle (500 ml).The demand/sales volume of Coca Cola in Bangladesh during 2011-2015 is shown in “Table 4” (Abdul Monem Limited, 2015) [6].

Table 4: Sales Volume of Coca Cola in Bangladesh during 2014-15

Quantity is expressed in million case (24 bottles per case)

Year	Dec-Feb	March-May	June-Aug	Sep-Nov	Sales volume of Coca Cola (% of total sales)	Total sales volume of soft drinks
2011	0.6	2.1	3.9	0.8	7.4 (68.5%)	10.8
2012	0.8	2.6	4.6	1.0	9.0 (68%)	13.2
2013	1	3.0	5.2	1.2	10.4 (67%)	15.5
2014	1	3.5	6.0	1.5	12.0 (70%)	17.0
2015	1.2	4.7	7.0	2.5	15.4 (73%)	21.0

“Table 4” shows the total sales volume of Coca Cola. It shows that the sales are higher during March to August. During this six months period, temperature is high, especially during April-July. The temperature rises up to 45 degree Celsius. On the other hand, sales volume is less during December-February period due to low temperature. During September-November, the sales volume rises due to two important festivals of two large religious group (Muslim and Hindu) take place. The information shows that the consumption of Coca Cola is increasing due to customer’s preference. The demand of Coca Cola varies seasonally. July to August is the peak time of selling. The demand is increasing year to year. The rate of increase varies within 1%-6% during 2011-2015 in case of Coca Cola.

In a nutshell, it can be stated that there is an opportunity for the company to maximize profit by increasing production through improving production process.

4.1.2 Forecasting

Gor and Mohan (2009) [7] showed the three types of forecasting in case of using time series data, such as Trends, Seasonal variation and Irregular variation. Trends relates to long term changes in prices whereas seasonal variation relates to repetitive or periodic variation in time series. Irregular variation refers to the erratic fluctuations in the data. Forecasting of sales volume of Coca Cola is shown in “Table 5”.

Table 5: Forecasting of sales volume of Coca Cola in Bangladesh during 2016-17

Quantity is expressed in million case (24 bottles per case)

Year	Dec-Feb	March-May	June-Aug	Sep-Nov	Sales volume of Coca Cola (% of total sales)	Total sales volume of soft drinks
2016	2.1	6.8	10.4	3.8	23.1 (74%)	31.0
2017	3.2	7.5	10.8	4.5	26.0 (74%)	35.0

The “Table 5” shows the increasing trend of total demands of CSD of the company but stagnant demand in case of Coca Cola (74% of total demand in 2016 and 2017).

4.2 Coca Cola Manufacturing in Bangladesh

The aim of the operation is to create and deliver products by changing input into outputs using a process, 'Input-transformation-output' (Slack, Jones and Johnston, 2013) [8]. They told that transformed resources which include materials, information of demand, market forecast and taste and preferences of targeted customers and transforming resources which include facilities like machineries, structures and staff like skilled or unskilled manpower. The given input becomes output when these are moved through processes. The transformation processes include chronological activities which change the form of input into new product/service.

Abdul Monem Limited imports concentration from Egypt, glass bottles and Can from Malaysia. Sugar and water are collected from own country (Abdul Monem Limited, 2013) [9]. The company manufactures PET bottles from preform. Information about market demand and store availability helps to determine the production limit. These are the transformed resources. There are three factories situated in three districts named Dhaka, Comilla and Chittagong (the most modern plant with designed capacity 780 BPM and utilizing capacity 635 BPM). So, utilization of capacity is 81%. More than 200 staffs are working in these factories. The factories are equipped with straight-line technology from Germany. These are the transforming resources. The company produces the coca cola by mixing concentration with water (treated through treatment plant) and sugar, bottling those using machines which are the transformation process.

4.3 Process of Coca Cola

Process has been identified from product differentiation and production process's point of view. The company produces Coca Cola, Fanta, Sprite and ice creams of Igloo brand. Production line and machineries are same for producing CSD. After completion of one product, they wash the machine and prepare the other one. For the ice-cream production, the company uses different production line with different machines. Coca Cola is also distributed through PET bottle, Can and RGB. Coca Cola is also differentiated through different flavour and sugar level. One is normal coca cola and another is diet coke. When coke is being filled in glass bottles, the machine is being set such a way that at a time 24 bottles are being filled. On the other hand, in case of pet and can, 12 and 8 packs are filled simultaneously. So, the process type is Batch where high volume of products. The nature of process technology is dedicated as large volume is being produced within specific period. High fixed cost is involved. Linearity is one of the main characteristics of the process. If one part of the process becomes more efficient than the next, it will create inventory. In case of Coca cola production, if the production capacity of the number of bottle is higher than the capacity of water treatment plant, the inventory of bottle will be needed. Ultimately it will have negative effect on the whole production process as it will increase delay and cost. Due to this, the position of bottleneck should be zero to make the operation smooth and speedy. There is a less process flexibility with high volume of operation. The production process does not need high skilled labour.

4.4 Performance Objectives

There are five basic performance objectives: dependability, speed, flexibility, quality and cost which are applicable to any types of complex or linear operation (Slack, Jones and Johnston, 2013) [8]. In case of selected company, the delivery time is 24 hours. More than 90% of the total delivery is given within time. It indicates the lack of dependability as 100% products are not being delivered on time. The company does not produce new products every year. In case of soft drinks, number of products produced is only four which is not impressive. The company can introduce Coke zero and Coke Life as there is a huge demand for Coca Cola in Bangladesh. The company is unable to deliver 10% products on time due to transportation and traffic jam. From the above mentioned discussion it can be stated that the company can improve its speed by reducing delivery. The defect of the produced goods is 1% which is tolerable. The company has testing laboratory in every factory to test the quality of the products (contamination, toxicity, sugar level, flavour etc.) (Sustainability Report 14/15, 2015) [10].

4.5 Application of JIT and Lean in Case of the Mentioned Company

The company is trying to reduce waste in the manufacturing process. The company is avoiding overproduction. The production process is running smoothly. No inventory is needed at the middle of the production. The defect is less than 1% of total production which is in tolerable range. The company is struggling with transportation and inventory of raw materials. To assure the smooth flow of raw materials three months inventory is being maintained which increase cost. There is weakness in transportation. The company is unable to deliver about 10% product on time to the distributors.

V. Conclusion

The company imports concentration, can and glass bottles. The lead time is one month for importing these materials though sometimes it is delayed. To avoid this risk, the company maintains 3 months of stock inventory which involves huge cost and manpower. It would be possible to reduce the time of stock inventory if

the bottles/cans could be produced in own country/nearby country. Bangladesh is a riverine country with some 700 rivers (World Bank, 2015) [11]. Water and rail transportation are cheaper and less time consuming than land transportation (Ministry of Finance, 2015) [12]. The delivery is delayed due to huge traffic jam. To avoid this delay, the company maintains stocks in its regional rented warehouse which increase cost. In this circumstances, the company can use the water and rail road which are cheaper and free of traffic jam. The competition of soft drinks in Bangladesh is very high. Many low quality CSD are being sold in small bottle. The company proposed “The Coca Cola Company” to market CSD in the small, colourful bottle to attract children. Due to policy “The Coca Cola Company” did not agree with this. “The Coca Cola Company” started marketing CSD in mini can since October, 2015 which decreased costof aluminium, 0.05p/ounce but increased sales volume (Coca Cola’s Clever New Trick, 2016) [13]. Now, it can be implemented in Bangladesh.

More research work needs to be conducted on production process, lean and agility taking into account the sustainability of the production process, layout and productivity and distribution network within the context of Bangladesh. Besides this, the research can be done on the impact of internal competition, economic factors like inflation and recession, customer’s choice of flavour and taste on company’s performance and the improvement of sales performance through improving production process. The challenges towards outsourcing and the increasing competition in locality also necessitates greater attention to innovation, logistics and benefit of collaboration in supply chain management system to improve the overall operation process as well as performance for maximizing profit margin.

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