COMPARISON OF VANDER MANAGED INVENTORY AND ORDER DELIVERY PROCESS OF AN BEVERAGE INDUSTRY OF INDIA: A CASE STUDY

HARPUNEET SINGH

PhD Senior Assistant Professor Department of Production Engineering Guru Nanak Dev Engineering College Ludhiana, Punjab India

Abstract- A case study was conducted in beverage industry of India. Data was obtained and analyzed by using different statistical tools. Vendor Managed Inventory and Order Delivery Process Method were compared. Lead Time, Response Time, Reorder Point and Cost Reduction Analysis was done. VMI method is found to be more efficient than ODP overall resulting in reduction of cast by 2 crores 12 lakhs 43 thousand Indian rupees

I. INTRODUCTION

In today's global scenario effectiveness and cogitativeness of the industry is fast changing. The Vander Management and Order Delivery Management are the two basic management concerns which are witnessing the global changes. Organizations are taking the advantages of competitive atmosphere by using the concepts of Supply Chain Management and Logistic Management Logistic Management Deals with the flow and storage of goods and related information. Supply Chain Management is process of flow of products and information from the Vender/Supplier to Manufacturer for Supply of raw material, from Manufacturer to Retailer/ Distributer as finished product and from Retailer/Distributer to End User for use of Final Product.

The essential operation process of an industry are sourcing (procurement of required material) making (production of goods by using procured materials) and delivering (Transporting the goods manufactured to end user) One of the main concern of an organization is to do planning of these process to reduce the cost at enhanced level of efficiency and market share. Coordinated planning or decision making by all the concerned parties of chain can lead to reduction in inventories, costs, litigations and thus enhance the efficiency, quality for product/goods/services and results in better market shares, reputation and profitability of the originations. All these factors can be obtained by using Supply Chain Management, Vander Management, Logistics and Order on Deliveries Techniques. In present Study a case study was conducted in Beverage Industry of India. The concerned industry is an international Industrial Organization famous for making Soft Drinks and Juices.

Review of Literature: Number of studies were conducted for evaluating the supply chains of different organizations but some specific and good studies are presented in this paper.

Nagarajan and Rajgoplan(2008) conducted a study to investigate the performance of Retailer Managed and Vander Managed Inventory systems. They analysis the lot size, holing costs, inventory contracts offered by retailers to improve system performances. The contracts were evaluated for Deterministic Order Quantity, Continues Review Policies and Periodic Review Policies.

Zavanellia and Zanoni (2009) surveyed a consignment stock system in single supplier multiple retailers supply chain environment with discrete demand. Surveyors presented an analytical model to analyze the benefits of consignment stock and the optimum replenishment decisions for both the supplier and retailers. Surveyors presented that according to the structure of the chain, the joint management of the inventory give modest to relevant rise in economic benefits.

Ru and Wang (2010) studied and compared the retailer managed consignment inventory and vender managed consignment inventory in a single period supply chain model with price sensitive uncertain demand. According to the researchers vender managed consignment inventory performs better the retailer managed consignment inventory.

Zanoni et al. (2011) Conducted the studies to analysis the Vander Managed Inventory with consignment Inventory Policy and Learning Curve. In case of VMI consignment Inventory Policy the vendor is responsible to manage the buyer's inventory and holds the requisite inventory till the buyer withdraws. In this policy vender is able to revise his production plans and shipments accordingly. The main results of this study was to present how learning in production can give flexibility to the supply chain stake holders in assigning the time and size of each shipment.

Kastsian and Monnigmann (2011) derived the steady state optimization of supply chain model that belongs to the class of Vender Managed Inventory, Pipeline Inventory and Order Based Production Control Systems. The supply chain was optimized by using the Normal Vector Method. Researchers predicted that the Normal Vector Method provides robust optimal points of operation for a number of scenarios.

Kristianto et al. (2012) proposed an adaptive fuzzy control application to support a vendor managed

inventory. Researchers used the fuzzy control methodology to generate an adaptive smoothing constant in the forecast method, production and delivery plan. The results predicted that the adaptive fuzzy VMI controls are better than the simple fuzzy VMI and traditional VMI controls, in terms of mitigating the bullwhip effect and lower delivery overshoots and backorders. The researchers also guide managements in allocating inventory by coordinating between different players of supply chain by using the fuzzy methodology.

Shu et al. (2012) Studied the Logistic Network Design problem with Vendor Managed Inventory. Researcher formulated the problem as set packing model and solved using Branch-and- Price Model. The results shows the insights on the benefits that integrated approach ca achieve significant profit improvements.

II. METHODOLOGY

A case study was conducted in a beverage industry which produces juices and soft drinks.

A detailed study according to Vendor Managed Inventory (VMI) technique and Order Delivery Process technique is used to evaluate Lead Time, Reorder Point, Response Time, Cost Saved and their comparison.

Data was collected from the organization and analyzed accordingly

Sr. No.	Product	Lead Time in Days	
	Soft Drink Base	With VMI	With ODP
1	Soft Drink A	6	10
2	Soft Drink B	6	10
3	Soft Drink C	6	10
4	Soft Drink D	6	8
5	Soft Drink E	6	10
6	Soft Drink F	6	10
7	Soft Drink G	6	10

	Product	Lead Time in Days	
	Juice	With VMI	With ODP
1	Juice A	12	20
2	Juice b	4	7
3	Juice C	4	4
4	Juice D	8	15
5	Juice E	10	15
6	Juice F	10	10
7	Juice G	5	15

Safety Stock = SS= (Maximum Lead Time – Normal Lead Time) x Average Demand

Service Level = SL = (Number of Orders Per Year- Number of Stock out)/ Number of Orders Per Year

Standard Deviation = σ= Safety Stock/ Safety Factor

Response Time =RT= PI (SS/Z (1,25x ($2/\pi)^{1/2}$ x σ)^2 – RI

Reorder Point =ROP= SS +(Average Demand /Day x Normal Lead Time)

Reorder Point and Response Time for ODP					
Soft Drink Bases					
P	SS	SL	σ	RT	ROP
A	56000	100	15598.89	4.03	56300
B	40000	100	11142.06	4.03	40240
C	48000	100	13370.47	4.03	48280
D	42000	100	11699.16	4.03	42220
E	16000	100	4456.83	4.03	16100
F	20800	100	5793.87	4.03	20930
G	24000	100	6685.24	4.03	24090
Juices					
P	SS	SL	σ	RT	ROP
A	1100	100	306.41	4.03	1106
B	1140000	100	317548.75	4.03	1148000
C	2800000	100	779944.29	4.03	2830000
D	16500	100	4596.1	4.03	16600
E	880000	100	245725.35	4.03	885000
F	385000	100	107242.34	4.03	387300
G	800000	100	222841.23	4.03	804650

Reorder Point and Response Time for VMI					
Soft Drink Bases					
P	SS	SL	σ	RT	ROP
A	56000	100	15598.89	5.02	56150
B	40000	100	11142.06	5.02	40120
C	48000	100	13370.47	5.02	48140
D	42000	100	11699.16	5.02	42110
E	16000	100	4456.83	5.02	16050
F	20800	100	5793.87	5.02	20865
G	24000	100	6685.24	5.02	24045
Juices					
P	SS	SL	σ	RT	ROP
A	1100	100	306.41	5.02	1103
B	1140000	100	317548.75	5.02	1144000
C	2800000	100	779944.29	5.02	2815000
D	16500	100	4596.1	5.02	16550
E	880000	100	245725.35	5.02	882500
F	385000	100	107242.34	5.02	386150
G	800000	100	222841.23	5.02	802325

Comparison of Cost Saving among VMI & ODP Methods				
Soft Drink Bases				
P	Unit of Measure	Reduction in ROP with VMI over ODP	Cost of Product Rs/Unit	Total Inventory Cost Saved
A	PKT.	150	1500	225000
B	PKT.	120	1200	144000
C	PKT.	140	1150	161000
D	PKT.	110	1200	132000
E	PKT.	50	1250	62500
F	PKT.	65	1200	78000
G	PKT.	45	500	22500
Juice				
P	Kg	3	1100	3300
A	Kg	4500	55	220000
B	Kg	15000	50	750000
C	Kg	50	65	3250
D	Kg	2500	45	112500
E	Kg	1150	40	46000
F	Kg	2325	45	104625
G	Kg	1325	45	59625

CONCLUSIONS

Case Study conducted at a beverage plant in India results in many conclusions. Some of them are Vender Managed Inventory system performs better the Order Delivery Process Method. Reduction in Reorder Point with Vender Managed Inventory as Compared to Order Delivery Process Method results in saving of 2 crores 12 Lakhs 43 thousand Rupees by minimizing the inventory level. Response time increase by 25% with Vender Managed Inventory as Compared to Order Delivery Process Method. Lead time reduces by 40% with Vender Managed Inventory as Compared to Order Delivery Process Method. Minimizing the inventory results in reduction of manpower and Store Stationery by 34% and 55% respectively

BIBLIOGRAPHY

[1]. Kastsian D. and Monningmann M. (2011) "Optimization of a vendor managed inventory supply chain with guaranteed stability and robustness", International Journal of Production Engineering, Vo. 131(2), pp 727-735

[2]. Krisitiantio Y., Helo P., Jiao J.and Sandhu M.(2012) "Adaptive fuzzy vendor managed inventory control for mitigating the Bullwhip effect in supply chains", European Journal of Operation Research, Vol216(2) pp 346-355

[3]. NagarajanM. And Rajagopalan S. (2008) "Contracting under Vender Managed Inventory systems using holding cost subsidies", Production and Operations Management, Vol. 17(2) pp200-210

[4]. Ru J. and Wang Y. (2010) "Consignment Contracting: who should control inventory in supply chain?" European Journal of Operation Research , Vol 201 pp 760-769

[5]. Shu J., Li Z., Shen H., Wu T. and Zhong W. " A logistics network design model with vendor managed inventor" International Journal of Production Economics Vol. 135 (2), pp 754-761

[6]. Zavanella L. and Zanoni S.(2009) " A one vendor multi-buyer integrated production-inventory model: the Consignment Stock case", International Journal of Production Economics, Vol. 118(1) pp 225-232

[7]. Zanoni S., Jaber M. and Zavanella L. (2011) " Vendor Managed Inventory (VMI) with consignment considering learning and forgetting effects", International Journal of Production Economics Vol. 310(3) pp 657-665

★★★