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EFFECTIVE IMPLEMENTATION OF SUPPLY CHAIN MANAGEMENT: A CRITICAL LITERATURE REVIEW

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Abstract

Supply Chain Management is employed by most of the organisations worldwide, so a variety of studies have been done to explore this field. During review of the open literature available in this field, the authors investigated that in present framework, there are a variety of problems in Supply Chain Management that desire the immediate attention of the researchers. In this context breaking solution of the Supply Chain Management can provide at different levels. In this paper, the authors have reported intensive studies which are based on the work done out by various researchers in the area of Supply Chain Management.

Keywords: *Supply Chain Management (SCM), Supply Chain Risk Management (SCRM), Green Supply Chain Management (GSCM), Closed Loop Supply Chain Management (CLSCM).*

I. INTRODUCTION

Supply Chain term was initially coined in the early Nineteen Eighties to explain the range of activities coordinated by a corporation to acquire and manage supplies. Businesses depend on their Supply Chain to provide them with what they need to survive. A Supply Chain consists of all stages concerned, directly or indirectly, in fulfilling a customer request. SCM can be defined as the management of flow of merchandise and services, which begins from the origin of products and ends at the products' consumption. It can also be defined as the management of materials, information and funds across the entire Supply Chain from suppliers through manufacturing and distribution to the final consumer. It additionally contains movement and storage of raw materials that are involved in work in progress, inventory and fully furnished goods. Supply Chains encompass the companies and the business activities needed to plan, make, deliver, and use a product or service.

A typical Supply Chain may involve a variety of stages. These Supply Chain stages include:

- Customers
- Retailers
- Wholesalers/Distributors
- Manufacturers
- Components/Raw material Suppliers.

1.1 Various Components of SCOR Model are follows:

- a. Plan:** The first stage in SCM is known as a plan. There is a need of strategy for managing all the resources that go towards meeting customer demand for our product or service. A big piece of the planning is developing a collection of metrics to monitor the Supply Chain so that it is efficient, costs less and delivers high quality and value to customers.
- b. Source:** This is the next stage in SCM. This stage involves identification of reliable suppliers. It also includes planning methods for shipping, delivery, and payments.
- c. Make:** This is the manufacturing step in which manufacturer

scheduling all activities necessary for production, testing, packing, and preparation for delivery.

- d. Deliver:** This is the part that many SCM insiders refer to as logistics, where companies coordinate the receipt of orders from customers, develop a network of warehouse, pick carriers to get products to customer and setup an invoicing system to receive payments.
- e. Return:** The problem part of the Supply Chain is generally referred as Reverse Logistics. In this stage manufacturer creates a network for receiving defective, excess products back from customers and supports customers who have problems with delivered products.

1.2 Drivers of SCM: There are five drivers of SCM to understand how a company can improve Supply Chain performance and efficiency. The five drivers are discussed below:

- a. Location:** They are the places in the Supply Chain Network where products are stored, assembled or fabricated. The two major types of locations are production sites, and storage sites (warehouse). Whatever the function of the location, decisions regarding location, have a significant impact on the supply chain's performance. For instance, a water purifier spare parts manufacturing company effort for responsiveness could have many storage sites located closed to customers even though this practice reduces efficiency.
- b. Information:** It consists of data and analysis concerning facilities, inventory, transportation and customer throughout the Supply Chain. Information is probably the most important driver of performance within the Supply Chain because it directly affects every of the other drivers. Information presents management with the chance to create Supply Chain a lot of responsive and economical. For example, with information on customer patterns, a clothing retailer can stock cloths in anticipation of customer demand which makes the Supply Chain more responsive.

c. Production: This driver can be made very responsive by building factories that have a lot of excess capacity and use flexible manufacturing techniques to produce a wide range of items. To be even more responsive, a company could do their production in many smaller plants that are close to major groups of customers so delivery times would be shorter.

d. Inventory: It is raw materials, work in process and finished goods within a Supply Chain. Inventory is an important Supply Chain driver because changing inventory policies can dramatically alter the Supply Chain's efficiency and performance.

e. Transportation: Movement of material and products from one place to another place known as transportation. For example, a retailer use, transportation service for sending products to the customer when an order is received. Many firms that sells merchandise through the web are ready to offer high level of responsiveness by using transportation to deliver their merchandise usually within Forty-Eight hours or less.

1.3 SCM Includes Three Main Processes which consist of:

a. Information Management: Correct and on-time information is pre-requisite for decision making. On other hand, supervision and management of this information can affect speed and quality of decision making and peoples' action in organization.

b. Logistic Management: Logistics is broader spectrum of operations related to the production, delivery of goods and services. Logistic operations also include warehousing and sourcing procurement functions. It encompasses transportation, stock and information system. It includes transport with warehouse, inventory, security, packing, containerization, labelling, distribution and time management etc.

c. Relation Management: Relation management impacts Supply Chain on all grounds and also its operation level so negligence in this section can cause failure in Supply Chain.

1.4 Cycle View of Supply Chain Processes: All Supply Chain processes can be broken down into the following four process cycles:

a. Customer Order Cycle: In this cycle customer buy products from a retailer through online or offline medium, it means it is the interface of a customer and retailer. It involves all stages from customer's order receiving to customer order fulfillment.

- i. Customer Arrival: The place to begin for any supply chain is the arrival of a customer. Customer arrival will occur once the customer walks into supermarket to create a buying deal, the customer calls a mail order telemarketing centre, the customer uses the net or an electronic link to mail order firm.

- ii. Customer Order Entry: In this stage customer tells his requirements to the retailer and describe that which type of product they want, after this retailer provide products according to customer's choice.

- iii. Customer Order Fulfilment: In this stage the customer's order is dispatched and shipped to the customer. It is necessary to update all inventories after the product is delivered to the customer.

- iv. Customer Order Receiving: Throughout the process, the customer receives the order and takes ownership. Records of this receipt may be updated and payment completed. At a market, receiving occurs at the checkout counter.

b. Replenishment Cycle: This cycle is similar to the customer order cycle only distinction is that retailer is now a customer. In this cycle retailer order products from distributor to manage all inventories. So, it can be said that it is the interface of a retailer and distributor.

- i. Retail Order Trigger: When a customer orders some product, it is filled by retailer then inventory is depleted and necessary to replenish for future demand. The purpose of the retail order trigger is to refill inventory, and maximize profit.

- ii. Retail Order Entry: This stage of replenishment cycle is similar to the customer order entry at retailer except that the retail merchant is now the customer inserting the order which is sent to the distributor. The process of inserting the order can be done through online or offline medium.

- iii. Retail Order Fulfillment: In this stage retailer's order takes place at the distributor and sent to retailer with the help of transportation. It seems to be very similar to the customer order fulfillment except that the size of the order is enormous than customer order cycle. The purpose of the retail order cycle is to provide replenishment order on time to the retailer at minimum cost.

- iv. Retail Order Receiving: In this process the retailer receives products physically and the status of inventory is updated. The objective of the retailer order of the retail order receiving process is to update inventory and so quickly and accurately at the cheapest price possible.

c. Manufacturing Cycle: In this cycle distributor buy products from the manufacturer, it means this cycle is the interface of manufacturer and distributor. It includes all stages which are involved directly or indirectly in the replenishment distributor inventory.

- i. Order Arrival: Throughout this process, a finished good warehouse or distributor sets a refilling order trigger based within the forecast of future demand and current product inventories. The resulting order is then conveyed to the manufacturer. In different cases, a manufacturer could also be manufacturing to stock a finished merchandise warehouse.

In the latter situation, the order is triggered based in product availability and a forecast of future demand.

- ii. **Production Scheduling:** when an order is arrival from distributor, manufacturer make a plan to fill orders. According to the order quantities manufacturer decides the sequence of production. The purpose of production scheduling is to fill orders of distributor on time at minimum possible cost.
- iii. **Manufacturing and Shipment:** This process is equivalent to the order fulfilment process described in the replenishment cycle. During the manufacturing part of the process, the manufacturer produces to the production schedule. During the shipping section of this process, the product is shipped to the customer, retailer, distributor or finished product warehouse. The objective of the producing and shipping process is to make and ship the merchandise by the secure maturity date whereas meeting quality necessities and keeping prices down.
- iv. **Receiving:** During this process the merchandise is received at the distributor, finished goods warehouse, retailer, or customer and inventory records are updated. Other processes related to store and fund transfer are take place.

d. Procurement Cycle: This cycle includes all the process or steps which takes place to buy a product from a business person. It starts from identification of need and ends at asset management. In this cycle a firstly a procurement plan is prepared and list all the suppliers. After this a request for quotation is issued and tender evaluation process takes place. Once a supplier is fixed for purchase goods and products a contract is issued with terms and conditions. Procurement cycle also includes management of supply chain, warehouse management and asset management.

2. CRITICAL LITERATURE REVIEW

A detailed review on SCM has been taken from past research papers. In this section, various factors for Supply Chain competitiveness are identified from the previous research work carried out in this field and the brief literature review of SCM has been carried out to understand about management and processes of Supply Chain Management strategy formulation from various articles. Study of SCM has been done to increase efficiency and profit levels of an organisation or a company. SCM Enablers have been identified in this section. Brief study of GSCM, CLSCM and SCRM has been taken. The brief reviews of some research papers from 2009 to 2019 are given below:

B.E. Narkhede, C. Anup (2009) stated that product flows in Supply Chains do not end once they have reached the customer. Many products lead a second and even third or fourth life after having accomplished their task at their first customer. Reverse logistics is an important part of Supply Chain but it is not recommended as forward logistics.

Chenghua Shi (2009) described the significance of implementing reverse logistics and analyzed the difficulties of implementing of reverse logistics. With the development of market, more and more enterprises have to confront the problem of reverse logistics. Thus, the ability to deal with the reverse logistics problem will become more and more important.

M.T. Melo (2009) reviewed the most recent literature on facility location analysis within the context of SCM and identified the characteristics that a facility location model should adequately address SCM planning needs. He discussed the general relationship between facility location models and strategic Supply Chain planning. Facility location selections play a crucial role within the strategic design of Supply Chain networks.

C.S. OU et al. (2010) investigated the relationships among SCM practices and their impact on firm's financial and non-financial performance. In order to understand the interactions between SCM practices and firm performance, this paper considers four internal factors- quality data and reporting, design management and process management, human resource management. A structural model was further constructed by integrating external SCM, internal SCM contextual factors and firm's financial performance.

J. De Vries et al. (2011) identified the parallels between the Industrial sector and health care services with respect to the development that has taken place in the area of SCM. Different modes of Supply Chain integration were discussed. Work on SCM in health care services has been done.

OU Tang et al. (2011) surveyed the most recent literature relevant to Supply Chain Risk Management (SCRM). The purpose of this paper was to investigate the research development in SCRM. This led to improve interest in SCRM.

Cristina Gimenez et al. (2012) explored the effectiveness of Supply Chain integration in different contexts. It aimed to show that Supply Chain integration is only effective in buyer supplier relationships. This analysis shows that Supply Chain will increases performance if Supply complexity is high, whereas a very restricted or no influence of Supply Chain integration may be detected in case of low Supply complexity.

S.J. Gorane et al. (2013) identified the SCM enablers and established relationships among them using Interpretive Structural Modelling (ISM). Infrastructure, Technology, Strategic, Human resource management are SCM enablers. ISM is a unique general-purpose analysis and decision support technique that provide a structured method for dealing with complex situations.

Dennis Stindt, Ramin Sahamie (2014) examined the most recent literature relevant to Closed Loop Supply Chain Management (CLSCM) in the process industry. It was shown that the research on CLSCM in the process industry is limited. It was described that the characteristics of reverse flow of continuous goods are different from characteristics in discrete industries.

Manoj Hudnurkar et al. (2014) surveyed in the area of Supply Chain collaboration. Researchers analysed 28 factors affecting Supply Chain collaboration. Supply Chain data sharing was found to be the most talked about factor for effective Supply Chain collaboration, so the papers further analysed within the context of the role of data sharing in Supply Chain collaboration.

Sunil Luthra et al. (2014) recognized major research work conducted on Green Supply Chain (GSCM) and to classify them to identify gaps in literature and opportunities for future research. This paper provided an integrative framework for study, design, implementation and GSCM performance.

Sunil Luthra et al. (2015) distinguished and analysed the key success factors behind successful achievement of environment sustainability in Indian automobile industry Supply Chains. They establish Critical Success Factors (CSFs) and performance measures of GSCM had been known through in depth literature review and discussion with specialists from Indian industry. They extracted six CSFs and four expected performance measures of GSCM practices implementation using factor analysis.

Wladimir E. S. S. et al. (2016) audited on OR methods in Fresh Fruit Supply Chain Management (FFSCM). The fresh fruit Supply Chain is characterised by long Supply lead times combined with important Supply and demand uncertainties, and relatively thin margins. These challenges generate a desire for management potency and therefore use of modern decision technology tools. They reviewed some of the literature on operational research models applied to the fresh fruit Supply Chain. They used many different criteria to classify the revised papers.

Kuldeep Lamba et al. (2017) studied on current trends and future scope on big data application in SCM. Three sub categories namely procurement, manufacturing and logistics had been kept and were searched using online digital library of Scopus database. The results in each area were summarized mainly from two perspectives i.e. year-wise trends and country-wise distribution. The most common finding across all area was that the interest in big data applications was only recent and very limited research had been carried out so far.

Rahmi Baki (2018) surveyed the most recent literature relevant to GSCM concept and problems during its implementation. Obstacles faced during the implementation of GSCM has been classified in five main areas: outsource, technology, knowledge, financial, participating and supporting. Literature review conducted has revealed twenty-four different barriers faced by businesses while leaving out the interactions and hierarchies between and the prioritization of these identified barriers.

Yiyi Fan et al. (2018) reviewed the extant literature on Supply Chain Risk Management (SCRM) from 2000 to 2016, including risk identification, assessment, treatment, and monitoring. They developed a comprehensive definition and conceptual framework to identify future research directions. They try to identify risk types and proposed risk mitigation strategies. They identified ten key future research directions. The analysis agenda guides future work towards maturation

of the discipline.

Ming Lang Tseng et al. (2019) discussed the literature on Green Supply Chain Management (GSCM) published from 1998 to 2017. Due to the rise of global warming and change in biodiversity, there is an increased pressure on firms to improve environmental performance. The paper began with the concept of GSCM followed by the methodology in extended literature review. The authors reviewed the literature of GSCM systematically and presented descriptive analysis based on meta-data analysis as well as revealed the insights based on content analysis.

Rakesh D. Raut et al. (2019) explored operational, technology and human resource based 'Hard and Soft' indicators for evaluating green management practices in the Indian agro-based industry context. Interrelationship between the 'green practices' and 'business performance' has been identified. Research findings reveal that Collective Green Transportation and Cold storages have a high influence on operational performance.

3. DISCUSSION

From the above literature reviews, we have learned about effective implementation of Supply Chain. A Supply Chain will be successive if there is no communication gap between supplier to the customer. For effective Supply Chain, planning is the most important component because this is a base for any industry, organization, etc. Drivers of the SCM play a major role to improve profit level of a company. If a company, consider drivers of SCM then there is a high probability of success. If there is any defect in product or service, then it is necessary to solve problem in minimum time by replace product or service. To replace defective products there is a need of effective Reverse Supply Chain. Research work on Reverse Supply Chain has been done in past but effective implementation of Reverse Supply Chain is necessary in the various field.

4. CONCLUSION

In this paper the attempt has been made to review the literature on SCM. We have presented a literature review for 19 research papers for the period between 2009 and 2019. Articles for review were chosen in random way where an only criterion for research papers was to be done after 2009. The aim of this study was to provide an up-to-date and brief review of the SCM literature that was focused on broad areas of the SCM concept.

This study focused on improvement in Supply Chain quality and implementation of SCM in manufacturing industries. The SCOR model can also be modified to reflect it into the health care sector. Components of SCOR model can be used to address, improve, and communicate SCM decisions within an industry and with suppliers, and a customer of a company. The drivers of SCM provide a useful framework for thinking about Supply Chain capabilities. These drivers can be developed and managed to emphasize responsiveness or efficiency(cost). Drivers determine the performance of Supply Chain so for each driver, managers must make trade-offs between efficiency and responsiveness.

This research work analyses common practices of Indian industries and suggests some methods for effective implementation of SCM. The study shows that SCM can be implemented in many fields like an industrial sector, health care sector and in organization. An effective implementation of SCM reduces uncertainty and risk in Supply Chain. This affects positively to inventory level, cycle time, business processes, and customer service. It also contributes to increase in overall profitability and competitive advantage. In this paper, the authors have discussed the main processes of Supply Chain, each performed at the interface between two successive stages of a Supply Chain. The paper's findings would be also helpful in further studies on SCM.

5. REFERENCES

1. B.E Narkhede, C. Anup, "Importance of Reverse Logistics in SCM", *Industrial Engineering Journal*, vol. 2, no. 4, pp. 22-26, 2009.
2. Baki R., "Literature Review on Green Supply Chain Management Concept and Problems During Its Implementation", *Journal of International Scientific Researches*, vol. 3, issue: 2, pp. 114-122, 2018.
3. Chengua Shi, "Study on Reverse Logistics based on Supply Chain Management", *IEEE Xplore Asia-specific conference on Information Processing*, pp. 495-498, 2009.
4. Chin S. Ou, Fang C. Liu, Yu C. Hung, David C. Yen, "A Structural Model of Supply Chain Management on Firm Performance", *International Journal of Operations & Production Management*, vol. 30, issue: 5, pp. 526-545, 2010.
5. Cristina Gimenez, Taco Van Der Vaart, Dirk Pieter Van Donk, "Supply Chain Integration and Performance: The Moderating Effect of Supply Complexity", *International Journal of Operations & Production Management*, vol. 32, issue: 5, pp. 583-610, 2012.
6. Dennis Stindt, Ramin Sahamie, "Review of research on Closed Loop Supply Chain Management in the process industry", *Flexible Services and Manufacturing Journal*, vol. 26, issue: 1-2, pp. 268-293, 2014.
7. Jan De Vries, Robbert Huijsman, "Supply Chain Management in Health Services: An overview", *Supply Chain Management: An International Journal*, vol. 16, issue: 3, pp. 159-165, 2011.
8. Kuldeep Lamba, Surya Prakash Singh, "Big data in operations and Supply Chain Management: Current trends and future perspectives", *Production Planning and Control*, vol. 28, issue: 11-12, pp. 877-890, 2017.
9. Manoj Hudnurkar, Suresh Jakhar, Urvashi Rathod, "Factors Affecting Collaboration in Supply Chain: A Literature Review", *Procedia - Social and Behavioral Sciences*, vol. 133, pp. 189-202, 2014.
10. Ming Lang Tseng, Md Shamimul Islam, Noorliza Karia, Firdaus Ahmad Fauzi, Samina Afrin, "A literature review on Green Supply Chain Management: Trends and future challenges", *Resources, Conservation and Recycling*, vol. 141, pp. 145-162, 2019.
11. M.T. MELO, "Facility Location and Supply Chain Management", *European Journal of Operation Research*, vol. 196, issue: 2, pp. 401-412, 2009.
12. Ou Tang, S. Nurmaya Musa, "Identifying Risk Issues and Research Advancements in Supply Chain Risk Management", *International Journal of Production Economics*, vol. 133, issue: 1, pp. 25-34, 2011.
13. Rakesh D. Raut, Sunil Luthra, Balkrishna E. Narkhede, Sachin K. Mangla, Bhaskar B. Gardas, Pragati Priyadarshinee, "Examining the performance oriented indicators for implementing green management practices in the Indian agro sector", *Journal of Cleaner Production*, vol. 215, pp. 926-943, 2019.
14. R. Aswan Kumar, P.C. Tewari, R.P. Singh, R.S. Ronald, "Integration of reverse Supply Chain Management with business process reengineering for a gear manufacturing unit", *International Journal of Mechanical and Production Engineering*, vol. 2, issue: 10, pp. 6-10, 2014.
15. S. J. Gorane, Ravi Kant, "Supply Chain Management: Modelling the Enablers using ISM and Fuzzy MICMAC approach", *International Journal of Logistics Systems and Management*, vol. 16, issue: 2, pp. 147-166, 2013.
16. Sunil Luthra, Dixit Garg, Abid Haleem, "Green Supply Chain Management: Implementation and performance- A literature review and some issues", *Journal of Advances in Management Research*, vol. 11, issue: 1, pp. 20-46, 2014.
17. Sunil Luthra, Dixit Garg, Abid Haleem, "Critical success factors of Green Supply Chain Management for achieving sustainability in Indian automobile industry", *Production Planning and Control*, vol. 26, issue: 5, pp. 339-362, 2015.
18. Wladimir E. Sota Silva, Esteve Nadal- Roig, Marcela C. Gonzalaz -Araya, Lluís M. Pla - Aragones, "Operational research models applied to the Fresh Fruit Supply Chain", *European Journal of Operational Research*, vol. 251, issue: 2, pp. 345-355, 2016.
19. Yiyi Fan, Mark Stevenson, "A review of Supply Chain Risk Management: Definition, theory, and research agenda", *International Journal of Physical Distribution & Logistics Management*, vol. 48, issue: 3, pp. 205-230, 2018.

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