

# A REVIEWSTUDY ON SUPPLY CHAIN MANAGEMENT IN A DAIRY INDUSTRY

Shivraj Thakur<sup>1</sup> and Om Prakash Mishra<sup>2</sup>

<sup>1</sup>Student ( M.Tech), <sup>2</sup>Assistant Professor

<sup>12</sup>Department of Mechanical Engg. J.C. Bose University of Science and Technology, YMCA Faridabad (Haryana)

Email:<sup>1</sup>[Shivrait540@gmail.com](mailto:Shivrait540@gmail.com)

## Abstract

India stands first in world milk production with a share of about 14 per cent in world milk production. For the success of a dairy industry/firm efficient supply chain management is a prerequisite. Thus, the supply chain performance of the processing units is a deciding factor. Milk supply chains are more concerned with controlling of milk quality and supply Fluctuations which are unique to this sector. Perishable goods like milk require a time efficient supply chain. This perishable factor can affect the milk supply chain. Supply chain management has seen as a source of gaining competitive advantage in the business world. Due to pressures from increased competition resulting from globalization of supply, processing and distribution networks, high levels of service expectations and competitive pricing, the supply chain management has become more important.

**Keywords:** Dairy Supply Chain Management, Barriers, SCM, Success factors, Implementation, Identification

## 1. Introduction

In India Milk has achieved a unique status in terms of its output value exceeding Rs. 1,00,000 crore and has made a rapid stride both in terms of number of milk producers and quantity of milk produced. In India, dairying is the important subsidiary occupation in rural areas, next to the main occupation of agriculture. Livestock sub-sector alone contributed to 4.22 per cent of the total value of GDP (Gross Domestic Product). Dairy Supply Chain Management (DSCM) in present scenario is basically defined

as a process of planning, implementing and controlling in the supply chain in order to satisfy the customer requirements as efficiently as possible. In a DSCM, the network management consists of initial stage i.e. from the storage of raw material work in process inventory and to final stage to finished goods. DSCM involves the function such as a procurement of milk and transformation of raw material into a semi-finished or finished products to consumers. The supply chain includes not only the manufacturer and suppliers, but also it includes logistics, warehouses, and retailers. The supply chain deals with the functions that lead to the fulfilment of customers in all perspectives.

A very simple example of supply chain can be explained by considering a single product such that when a customer's purchase a product online like say from AMAZON the supply chain includes the customers, Amazon websites, its warehouse and all of Amazon's suppliers and their suppliers. The websites provides all the relevant information regarding price, variety of the product and product availability. After making the product choice, the customer enters the order information and pay for the product.

In context of Indian Dairy system has been the leading producer and consumer of dairy products worldwide since 1998 with a sustained growth in the availability of milk and milk products. Dairy activities form an essential part of the rural Indian economy, serving as an important source of employment and income. In any case, the milk generation per creature is fundamentally low when contrasted with the other real dairy makers. Additionally, about the majority of the dairy produce in India is expended locally, with most of it being sold as liquid milk. By virtue of this,

the Indian dairy industry holds colossal potential for esteem expansion and in general advancement. As per the most recent report by IMARC Group, titled "Dairy Industry in India 2019 Edition: Market Size, Growth, Prices, Segments, Cooperatives, Private Dairies, Procurement and Distribution", the dairy advertise in India achieved an estimation of INR 9,168 Billion of every 2018.

The market has been sectioned into two classes, organised and unorganised market. Based on item type, the market has been sectioned into milk and esteem included dairy items. In light of focused scene, the key players in the market are GCMMF (Amul), KMF, Mother Dairy, TN Cooperative, Saras and Hat sun Agro Product Ltd. Core Activities of Dairy Supply Chain is to such an extent that a Dairy inventory network involves on six centre exercises, for example, creation, transportation, handling, bundling, stockpiling and utilization. Particularly, it is complex issue to design an efficient, hygienic and economic dairy supply chain for emerging countries.

The purpose of this paper is to understand the basic functions and parameters such that a Dairy scm is a brief network in which different types of parameters after analysis gives the proper understanding in the field of milk area as we all are also involve in it. The rest of the research paper is structured as: The next section provides the supporting literature review to the identification and understanding about the SCM in dairy industry, section 3 discussion, section 4 lists the barriers, followed by the conclusion in section 5.

## 2. Literature Review

An assorted variety of wellsprings of writing concerning the supply chain network organization methodologies requires a methodical strategy in food preparing industry (MOR, R. S., Bhardwaj, A. and Singh, 2017). In that capacity, while investigating an idea, the organized structured literature review (SLR) can be considered as a methods for featuring the key standards, bottlenecks and administration techniques being trailed by driving associations concerning dairy businesses. This paper reports a SLR of nourishment supply chain of dairy industry (DSC) improves. There is a need to study this issue in enhancing the operational

efficiency of the dairy inventory network (According to Subburaj et al. (2015). The principle target of this paper is to learn about the issues in enhancing the operational efficiency of the dairy production network.

In view of the examination work there are five territories of core interest. They are,

- Creation of unique dairy zone.
- Implementing dynamic milk procurement method.
- Strengthening helpful social orders.
- Creation of feed bank and expanding feed efficiency.
- Integrated creature well-being plan and data innovation.

The term "Knowledge Optimization and Food Chains" returned only three mathematical/algorithm related papers which were not suited to this study. Therefore, the term knowledge sharing which was closest to the focus of this paper was utilized.

The findings of the review conducted in this study indicate that researchers have indeed investigated knowledge optimization strategies from diverse theoretical, conceptual, substantive and methodological perspectives. However, this paper identifies the knowledge optimization strategies which are applicable in supply chains and incorporates the missing nuances introduced by the food industry. There are three key issues to be discussed here. These include:-

- Dearth of research focused on knowledge optimization in the food industry.
- Lack of robust inter-firm knowledge optimization strategies which are relevant to the food industry.
- Exploring sense making as a knowledge optimization strategy in food chains.

## 3. Discussion

The literature review on DSCM has been peer reviewed in context of Indian dairy system. The article from 2014 to 2018 have been scrutinised

to find out the current practices and prevailing barriers in front of Indian Dairy Supply Chain.

### 3.1. Dairy Supply Chains Management (DSCM)

Milk Production in India was mere 20.80 Million Ton in 1970s, which rose 155.30 Million ton as per data of national dairy development 2015. This also claims India as the highest milk producer of the world. SCM of the Indian dairy industry is basically involves three tier system which includes execution of milk from the villagers(dairy farm) , then it is brought to the manufacturing unit by means of a transport system for manufacturing and at last it is supplied to the markets to the end users .

### 3.2. Milk Processing

The packaged milk undergoes several processes. Following steps are mentioned which is in practice at a dairy industry.

1. Milk is taken out from the milching animal on the daily basis by the dairy farmers (large, medium and small scale farmers).
2. Collection of milk by collection centres (various milk cooperatives societies).
3. Milk collected by the cooperative societies are sent to the dairy plants where chilling of milk, processing and packaging of milk and milk product, transportation of milk and milk product is carried out.
4. The transportation of chilled milk and milk products from one place to another is done through the means of refrigerated vans, or insulated milk tankers vans of private, government and cooperatives societies.
5. Final processed milk and milk products are transported to various retails outlets, shops, and to retails markets from where the processed milk and milk products lastly reaches to their end consumers.

The schematic view of a xyz dairy industry that how milk is manufactured and supplied to the market as below:-

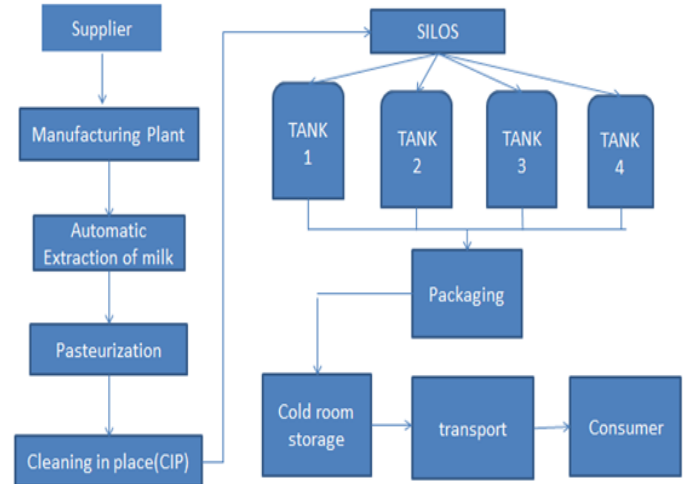


Fig 2:- Basic Arrangement of SCM in a Dairy Industry (AMUL)

The above points can be explained as:-

- **Supplier:** - In this milk is procured through individual producer(individual producers who are located nearby milk collection centre.), through co-operative organizations(organization which is responsible for uninterrupted supply of milk to the dairy plant),through contractors(contractor supplying milk to the dairy plant collects the milk from producers at a cheaper rate and transports the milk to the dairy),Milk reception from milk collection cum chilling centres(Milk is collected at various milk collection centres from nearby villages in 40 litre cans usually belonging to the organization).
- **Manufacturing plant:** - After the milk is procured from various different pathways then it undergoes for manufacturing process to make different items.
- **Pasteurization:** - It is a procedure in which milk is heated upto certain temperature and allowed to cool very frequently certain packaged and non-

packaged foods(for example, milk ) are treated with mild heat, normally under 100 °C (212 °F), to dispose of harmful bacteria that are present in the milk and expand timeframe of realistic usability. The procedure is expected to disinfect foods by pulverizing or deactivating life forms that add to decay, comprising vegetative bacteria however not bacterial spores.

- **Cleaning in Place:** - It is a kind of automation in which cleaning of pipes after excretion of milk from the trucks is done at the same time.
- **Silos:** - A silo is an arrangement in the form of tanks for storing bulk materials. Silos are utilized in horticulture to store grain or matured feed known as silage. Silos are all the more regularly utilized for mass stockpiling of grain, coal, concrete, carbon dark, woodchips, nourishment items and sawdust. Here Silo is main storage tank of processed milk
- **Packaging:** - Packaging is the science, workmanship and innovation of encasing or securing items for appropriation, stockpiling, deal, and use. Packaging likewise alludes to the way toward structuring, assessing, and producing packages. Milk is pressed by the required benchmarks through programmed procedure with the assistance of a programmed pressing machine (TETRAPACK).
- **Cold Room Storage:-** after the milk is being manufactured it is kept in cold room for some time as it need to be serve or supply in the market freshly. It is basically a cooling chamber, maintained at minimum temperature to store milk products.
- **Transport:** - It deals with the logistics that is the supply of fresh prepared milk in the markets.

- **Consumer:** - They are the end users that users that consume it.

### 3.3 Indian dairy supply Chain Models

Being a leading country in milk production several Indian dairy companies are playing very important role such as; Amul, Mother dairy, Vita, Parag, Sudha etc. The supply chain of each company is similar. These industries produce variety of dairy product such as Milk, Curd, Lassi, Ghee, Butter, Cheese, etc. The most disadvantageous for Indian supply chain is its varied atmospheric temperature from one part of country to another part. The milk products are very much susceptible to the environmental conditions. Hence transportation and its preservation requires specialised van and storage, where controlled temperature is to be maintained always i.e. in tune of 7x24.

## 4. Key Barriers in Dairy Supply Chain Management (DSCM)

Based on the literature review and discussion with the experts from industry and academia, the following key barriers are identified too the effective study of DSCM

- **Wastage due to leakages at shop-floor:**  
Wastages in milk processing plant occur in the form of water, steam and milk due to leakages and unsealed packaging. Wastages in an industry lead to reduced productivity and high product cost.  
In accordance with discussion with the experts this problem can be reduced by using spill proof system by using of an automatic packing machine that allows easy flow in the production.
- **High production downtime:**  
High production downtime in milk processing plant occurs due to frequent machinery breakdowns, power failures, poor maintenance of machinery and conveyor etc.

- **Lack of automation and out-dated technology:**

Today's dairy plants need to be modernized so as to compete globally. This can occur only with the process automation and implementation of modern technology in the production process.

- **Traceability of machinery breakdown and quality issues:** Another major issue involves 'no provision for traceability of machinery breakdown and quality issues'. The traceability of milk quality matters is major factor for dairy industry as this reduces various non-value-adding (NVA) accomplishments due to sampling and testing of milk.

- **Unbalanced production line:**

The unbalanced production line is another major concern in dairy industry. Milk pouches from machine are stored in a tray and there exists two operators on each workstation who are responsible to put the milk pouch in bin/crate which are moving along with the conveyor chain.

- **Over processing and operator's negligence:**

Another issue in milk processing is the over-processing of milk and milk products. The wasted milk due to leakages is again processed and packaged into pouches which is 'Muri' and needs to be eliminated through proper machinery maintenance and automatic product packaging line.

- **Improper demand forecast:**

For the products with short life cycle, the accuracy of the forecast is of crucial importance because of the volatile demand pattern, influenced by an environment of rapid and dynamic response. It is found missing in dairy industry.

- **More waiting time at milk packaging line:**

The packaging technology of products required to be updated and well

maintained for faster packing of material. Use of belt conveyers and automated milk packaging machines is indispensable.

## 5. Conclusion

The study has been taken thought to the diverse perspectives in understanding the supply chain of dairy industry network. Milk supply chains are progressively worried about controlling of milk quality and supply fluctuations which are which are unique to this sector area. Transient products like milk require a period proficient inventory network. For the accomplishment of a dairy industry/firm effective production network the board is a pre-essential. In this manner, we need to center to conquer the issues and difficulties before Indian dairy industry. This sort of continuance in such business condition must be accomplished by methods for composed production network coordination.

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