

A STUDY ON EVALUATING SUPPLY CHAIN RISK AND TOTAL QUALITY MANAGEMENT IN DAIRY INDUSTRY.

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ABSTRACT:

Supply chain is the chain of relationship among all the persons, organizations, resources, actions and technology concerned in the manufacture and sale of a product right from the manufacturer to the end user. No business organization runs without any risks and uncertainties but here the risks and uncertainties is double that of normal business as milk is a perishable product, therefore without proper supply chain the product cannot reach the customer. The paper is shaped based on the internship I did in a dairy industry. The specific objective of this paper is about supply chain management's importance in dairy industry and the risk involved right from collecting raw milk from suppliers (farmers) till reaching the customers and also to overview the total quality management in the dairy industry. Quality management has an ability to stimulate an organization's product, process and administrative innovation when strategically associated with internal contingency.

Keywords: *Supply chain, Risks, Uncertainties, Impact and Perishability, Total quality management.*

INTRODUCTION

Supply chain management is acquiring an enhanced response irrespective of the type of industry and so is the risk of supply chain management. Supply chain management is the active streamlining of business supply side activities to maximize customer value and gain a competitive advantage in the market place. SCM is a common approach with wide range of applications to take an integrated look at closely related procurement, production, storage and distribution process. Dairy products are one of the most important fresh food segments. Dairy industry is one of the vital and significant component of many economies and is a major industry in the developing and most developed countries. But there are many disruptions in the supply chain, in order to have an efficient and effective supply chain in the long run, it is highly essential to identify and mitigate the risks and uncertainties

Risk and uncertainty, though used interchangeably in various studies, are not same wherever in case of risk the probability is known, it is not known for the uncertainty Risk and uncertainty has always been an significant issue in supply chain management and is extensive. Risk management starts with finding the risk and reducing or mitigating the risk through risk response development.

Quality does not happen by fate; it must be designed and well planned. Quality control management involves planning, quality control and quality improvement. The key elements in implementing company-wide strategic quality planning are in turn seen as identifying customers and their needs; establishing optimal quality goals; creating measurements of quality; planning processes capable of meeting quality goals under operating conditions;

REVIEW OF LITERATURE

- 1) Mamta Patel et.al (2015), discussed the benefits and problems faced by Indian Milk Industry such as low quality, safety of milk and energy saving. The aim of this study is to apply PDCA (Plan- Do-Check-Act) approach to assess the causes that affect the productivity and quality of the dairy industry. After reviewing

the literature they found some TQM factors like Top management commitment (Leadership), Supplier Quality Management, Customer Focus and Employee Participation to assess the quality in dairy industry. They identified that inefficient management and poor technology are the major problems for Indian Milk Industry and recommended that if all the TQM factors are balanced in a systematic way the concept of TQM and Deming's PDCA will provide competitive advantage to the Indian Milk Industry and it will result for higher productivity and profitability

- 2) Neha Kalra and Anoop Pant (2013) examined the Critical Success Factors of Total Quality Management in the Indian Automotive Industry. Data was collected from the Manufacturers, Suppliers and Sub-contractors of Automobile organizations in National Capital Region of India. They identified 8 Critical Success Factors like Policy and Strategic Planning, Process Management and Control, Customer Focus and Satisfaction, Employee Focus, Information Management, Quality Leadership, Supplier Focus and Satisfaction and Organization Specific Business Result. Among these eight CSF's three CSF's like policy and strategic plan, quality leadership and customer focus and satisfaction are identified as the most important factors for automotive industry to generate higher revenue and profit.
- 3) Himanshu et al. (2012) in their research study, considered the customer to be an integral part of the supply chain. Any supply chain is required to satisfy customer needs while generating the profit for itself. Supply chain activities start with an order from the customer and finish with a satisfied customer. Coordination is essential between the suppliers, processors and distributors for effective SCM. The elements such as inventory maintenance, replenishment and lead times are equally significant for fluctuation of orders and transportation costs.
- 4) Hilletoft and Eriksson (2011) undertook their study on coordinating new product development with supply chain management. The study emphasized on the need to produce innovative and value-adding products
- 5) Li et al. 2002; Simatupang et al. 2008 tried to elaborate the attributes of coordination, we can say that coordination in a supply chain involves putting the existing interdependencies in order coordination involves cooperation between firms sharing important information with each other in the process of developing, producing and distributing goods and services to end marketplaces. Coordination of different business activities among units becomes vital as organizations pay much attention to their core activities
- 6) The studies carried out by Monczka et al. (1998), Young-Ybarra and Wiersema (1999), and Murali et al. (2011) have brought out that trust is the only force which binds all the parties to reap mutual benefits. However, Zimmer (2002), attempted to find a coordination mechanism which may help to improve decentralized decision-making. The study revealed that in a situation where decentralized decision-making existed, coordination was essentially required for lowering the total costs of supply chain in comparison to a centralized system.

OBJECTIVES

- The main goal of this paper is to find out the risk concerned in the supply chain of dairy industry at various levels and finding out the impact of risk.
- And also to get an overview of total quality management in an dairy industry

CHILLING OF MILK

It is essential and vital that the milk is to be cooled immediately after procuring it .The quicker the milk is cooled the better will be the quality of the milk. Milk leaves the udder at approximately 35 degree Celsius but only rapid cooling to a storage temperature of around 4 degree Celsius prevents or minimizes micro-organism growth. As I mentioned earlier the industry where I did my internship they collect the milk around 60 km radius from the industry.

They also have bulk milk collection centers and village level collection centers at various places and they cool the milk right after collecting it before transporting the milk to the main industry, if the milk has to be transported to longer distances it is necessary for it to be cooled to protect the milk from the spoilage by the growth of micro organisms. There are several methods of chilling of milk 1.can immersion 2. Can cooling 3.surface cooler 4.tubular cooler 5.plate chiller 6.bulk milk cooler.

Using one of the methods the milk has to be cooled and transported through tankers and containers. Without chilling of milk, milk cannot be transported i.e. the supply chain cannot be continued.

QUALITY AND TESTING

After chilling the milk it does not mean that all the milk are of good quality. Good quality milk has to be free of debris and sediment; and abnormal color and odour ; low in bacterial count, free of chemicals like antibiotics, detergents and of normal composition and acidity .The quality of raw milk is the major factor determining the quality of milk products .good quality milk products can be produced only from good quality raw milk.

The hygienic quality of milk is of key significance in producing milk and milk products that are safe and suitable for their intended uses. To achieve this quality, good hygiene practices should be applied throughout the dairy chain. Among the causes of small-scale dairy producers' difficulties in producing hygienic products are informal and unregulated marketing, handling and processing of dairy products; lack of financial incentives for quality improvement; and insufficient knowledge and skills in hygienic practices.

Milk testing and quality control should be carried out at all stages of the dairy chain. Milk can be tested for:

- quantity – measured in volume or weight;
- organoleptic characteristics – appearance, taste and smell;
- compositional characteristics – especially fat, solid and protein contents;
- physical and chemical characteristics;
- hygienic conditions, cleanliness and quality;
- adulteration – with water, preservatives, added solids, etc;
- Drug residues.

Examples of simple milk testing methods suitable for small-scale dairy producers and processors in developing countries include taste, smell, and visual observation (organoleptic tests); density meter or lactometer tests to measure the specific density of milk; clot-on-boiling testing to determine whether the milk is sour or abnormal; acidity testing to measure the lactic acid in milk; and the Gerber test to measure the amount of fat in the milk. After testing the milk the milk has to be processed further.

STANDARDIZATION

As the milk is collected from different farmers each can of milk will contain each composition. Since the milk collected from various farmers need not be of same composition so it is a very common practice to adjust the composition as per the requirement. Without appropriate compositional manipulation of milk may lead to poor quality product, or a product that does not meet legal requirements, or it may be an economical loss to the processor.

Standardization thus refers to the process by which the milk composition is adjusted to the desired level. The most commonly measured compositional parameters are fat and SNF for market milk, although sometimes fat alone may be taken into consideration for standardization. Accordingly, the process of standardization involves lowering or raising the level of a particular constituent(s) to the desired value especially fat

When milk is required to be standardized for both fat and SNF, the basis of calculation of the quantity of skim milk or cream to be added is the ratio of fat to SNF, and the total solids (TS) content .If the desired fat-to-SNF ratio is higher than the actual ratio in the available milk, then skim milk will be required to be added. On the other hand, when the desired ratio is lower, cream needs to be blended into the milk. It is, therefore, necessary that both the fat and SNF contents of the milk to be standardized, and those of cream or skim milk to be used are known. If the fat content of cream or skim milk (separated from a milk of known fat and SNF contents) is known, the SNF content can be estimated as under

PASTEURIZATION

Pasteurization slows the development of bacteria in foods (usually liquids) by heating the milk to a certain temperature and then cooling it. Milk sold in stores must be pasteurized in a specific manner to pass government standards. Drinking milk that has not been pasteurized comes with a higher risk of bacterial disease, which is especially dangerous for young kids, the aged, and anyone with a weakened immune system.

So for producing quality milk pasteurization is a necessary process.

STERILIZATION

Sterilization (in bottle) is the term applied to a heat treatment process which has a bacterial effect greater than pasteurization. Although it does not result in sterility, it gives the processed milk a longer shelf life. This is achieved partly by using a more severe heat treatment (about 110°C for 20–30 min) and partly by applying the treatment after the bottle is filled and sealed which eliminates the risk of contamination during packaging.

After completing the above process the milk is packed and stored in cold storage room at 4 degree Celsius till it is taken to the containers and milk vans for transportation of milk to the dealers, buyers or consumers

CONCLUSION:

The main conclusions which could be drawn from the above are as follows; above are the ways in which effective and efficient supply chain and quality management should be maintained in the dairy industry .If the above process is carried out properly then risks and uncertainties in supply chain and in quality management can be mitigated. And also dairy has to take measures on various elements related to focus on employee like training and development, employee involvement and reward management to enhance the morale of the employees and to make them more committed towards their work

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