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Supply Chain Management for Food Processing Industry– A Review

Naitik M. Patel¹, Vivek A. Deshpande²

P.G. Student, Department of Mechanical Engineering, G.H.Patel College of Engineering and Technology , V.V.Nagar,
Gujarat, India¹

Assistant Professor, Department of Mechanical Engineering, G.H.Patel College of Engineering and Technology
V.V.Nagar, Gujarat, India²

ABSTRACT:This paper explores ways of improving transportation and supply chain management within the food processing industry (sugar industry). It involves the concept of lean tools, transportation model and supply chain management in the food processing industry. Consistent supply of quality raw material (sugar cane) for processing industry is missing with improper handling and transportation systems with chances in loss of productivity. In today's competitive market, it is extremely difficult to successfully produce high quality, low cost products without any other extra cost of suppliers. A supply chain management is an integrated network including people, organizations, information, activities and resources. Supply chains management must be able to accommodate uncertainty and variation of supply because these are vital factors that affect supply chain performance. In supply chain management information sharing system is most important for better performance. This paper represents the ways to reduce in lead time using lean tools and supply chain management.

KEYWORD:Supply chain management, Food Processing, RFID, Productivity

I. INTRODUCTION

A non-segregated making network that typically includes people, firm, movement, information and assets is known as a Supply chain management (SCM). Supply chain management is more important in food processing industry because timing play a vital role for productivity with high quality, lowcost and with limited resources of raw material. Achieving a high quality of finish product needs high quality of raw material in safe condition and also within time in food processing industry, Supply chain management facing a problem in food processing industry like inconsistencies which occur in supply chains that make a problem for the industry to be consistent. Irregularity and unreliability create risk and may destroy profitability for the parties involved in supply chains.(Mangal, 2013)Irregularity in the food processing industry occurs due to different factors like transportation, social, financial and physical linkages across the chain. Many of these factors are related with each other and difficult to quantify.

II. AIMS

A brief literature review on food processing industry supply chain management and its processes, the properties which create Irregularity, and strategies which are use to lower the Irregularity in the food processing industry supply chain management.

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III. SUPPLY CHAIN MANAGEMENT (SCM)

The concept of Supply Chain Management (SCM) was developed in processing management is related to customer service, demand, flow of material, and distribution for making an improvement in production. It is a combination and coordination of business activity that control the flow of material dispatch from supplier to customer.

SupplyChain management network deals with analysis of information from every node on the Supply Chain to cut down working cost. In 1776 Adam Smith proposes a development in production methods by specializing working in definite task for supply chain management. In between 1859 to1915 F.W. Taylor present with new conception of “function Management “ which leads to value Engineering technique developed by L.D. Miles in 1950 to resolve storage, allotment, Scheduling processing, control issue and location layout.

In 1970 supply chain management was known as “Distribution “that classifies the Marketing organization Management, it’s aimed to reducing storage, managing efficient distribution and movement of storage. From 1980s the Japanese management technique was introduced to improve the productivity.

Simultaneously increasing in cost of transport and competition had compelled to decrees supply chain operating cost. In 1990 effect on worldwide and decontrol come in large competition, which show change in supply chain management. Enhancement of customer service became a new project of Supply Chain Management In future introductionof Electronic Data Interchange (EDI) and Radio-Frequency Identification (RFID).

How supply chain management work in any food processing industry is define as the agri-industrial system aims for plantation, cutting, transport and processing form farm to mill and mill to market. All food processing industry supply chain is highly integrated and contains:

- a) Food Plantation
- b) Cutting
- c) Food Transportation to Industry
- d) Industry for Processing
- e) To Market

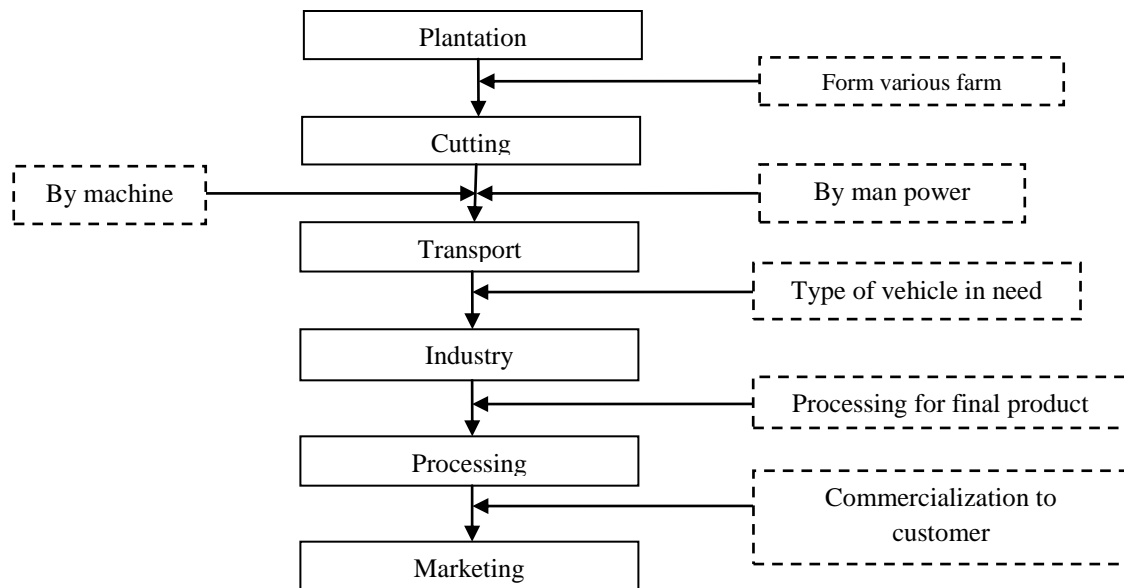


Figure: 1 Food Processing Supply Chain Management

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Irregularity in the food processing industry happens due to many logistical, social, economic and physiological linked across the supply chain. Most of this factor is related, such as the cutting and transporting of raw material, many physiological and social are difficult to quantify. Irregularity makes a risk and may lessen the profitability for the firm involved in the supply chain. For that reason, lessen the irregularity in the food processing supply chain has the potential to increase profitability. Impact of supply chain irregularity can be solved by flexible strategies. However, flexibility is difficult due to the varying irregularity of firm in the food processing supply chain, their adverse objectives, the geographical span of the system, managerial issue, as well as raised in cost. The combination of arrangement in plantation, cutting and milling systems are huge and differ from factory to factory. Cooperation between firms is an important component, to support well organized business operations and to less irregularity in food processing supply chains. Other supply chain makes unreliability and irregularity in food processing unit. These aspects are related with each other in supply chain. The main thing for the supply chain starts from farm to the processing unit. Two main aspects are reviewed are quality of raw material and flow of raw material regularity in required as per factory need per day capacity. It is difficult to manage the relationships fall beyond the scope of the study.

Get maximum recoveries using matured food by computerized harvesting programmed, plantation of fresh variety of product, Transport of food from farm to industry within the lowest time, decrease in process stock, byproduct usage up to its micro level, delivery of finished goods to customer can be achieved by expanding intelligent supply chain in and around the firm.

Continuation of the capable in the new description of the worldwide and liberalization policy many firm are coming to stop as a result of this. In the field of supply chain there are huge changes. Information technology along supply chain makes an effective tool towards the success of business. All firms are moving towards independent goals, planning for maintaining in competition. Supply chain management is area, which can give clear outlook about the future of business and hold against the competitive market.

IV. SCM OBJECTIVE

1. Remove communication gap between agriculture departments and transport departments to avoid delays in deliveries and avoid quality complaints
2. Combine the firm wise product range by build up the customer base and formulate product as main business
3. Eliminate all raw material cost by 5% to be competitive in the market.
4. Minimize the stock levels.
5. Reduce export and documentation and customer clearance and in delays

Supply chain management should be adopted for the continuous improvement in every part of industry.

Supply chain management exists in, marketing, planning, manufacturing, purchasing, distribution within and beyond the firm. Supply chain management shows a way to cost minimize all around the chain, the supply chain not only includes manufacturers and suppliers, but also transporters, warehouses, retailers, and customers themselves.

V. RFID TECHNOLOGY

Radio frequency identification (RFID) is a form of wireless communication that uses radio waves to identify, track objects and data collection technology. An RFID system has tags and reader that communicate with each other by radio waves. RFID tags are so small and require so little power that they don't even need a battery to store information and exchange data with readers. (Brintrup, Ranasinghe, & McFarlane, 2010) This makes it easy and cheap to apply tags to all kinds of things that people would like to identify or track. In addition, the technology usually includes an information management

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system for processing and transferring the produced data. For a more detailed description on the technology, the reader may refer to Lehpamer (2006) or Ranky (2006).

VI. HISTORY OF RFID

Early RFID technology was developed shortly after radar was invented before the Second World War.(Brintrup et al., 2010) The first application of the technology was to identify enemy planes among the country’s own planes when they were arriving home (Roberti 2005).

Table: 1 Major Advancements of The Technology Since Then Are Presented.

Decade	Advancement
1920s	Development of radar and early RFID, which was a combination of radio broadcast technology and radar
1940s	Identify friend or foe systems for military planes in the Second World War
1960s	Tagging was developed further to improve the safety and security in transporting nuclear materials
1970s	The first US patent for active RFID tag with rewritable memory Passive transponder used to unlock a door without a key. The technology was transferred to the public sector by Los Alamos Scientific Laboratories in 1977 resulting in two companies, and civilian use began
1980s	First automated toll payment systems based on RFID Passive RFID system based on ultra-high frequency (UHF) radio waves to track and identify cows First low frequency (125 kHz) systems which enabled smaller transponders First high frequency (13.56 MHz) systems which offered greater range and faster data transfer rates
1990s	First UHF system by IBM Auto-ID Centre was established at the Massachusetts Institute of Technology in 1999: the research on using low-cost tags in supply chain was begun by David Brock and Sanjay Sarma
2000s	Air interface protocols (Class 1 and Class 0), and the EPC numbering scheme were developed EPC global was established to commercialese EPC technology
2010s	Miniaturisation and technology development go further Cost of RFID technology continues to go down Technology continues to spread within numerous fields of industry

The main parts of a RFID-based information management system include (see Figure 2)

- (1) Tag is attached to a product to identify it. The microcircuit of the tag includes a unique code and/or other information.
- (2) Tag reader (manual or gate). The information of the tag can be read and possibly altered using the reader. The reader has an antenna that emits radio waves, and the tag responds by sending back its data.
- (3) The reader is connected to an information management system, which can be used to process the information included to the tag. This generally includes a server connected to a database, and system management software with a connection to background programs such as Enterprise Resource Planning (ERP).
- (4) The end-users have an access to the database via a graphical user interface, which enables flexible use of information for various purposes.

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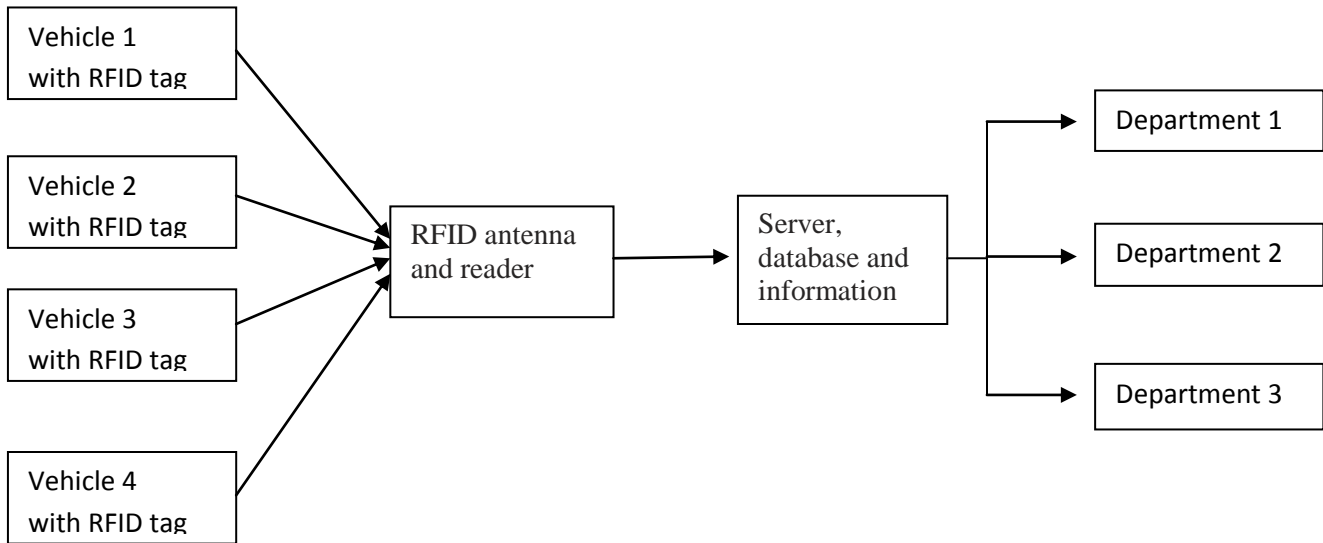


Figure: 2 Main Parts of RFID-Based Information

VII. DISCUSSION

I have referred six research paper including topics like supply chain management, productivity, total quality management, RFID. These topics are how much important for food processing industry is described below table with appropriate learning.

Table 2: Overview of Case Industries and Learning

Title	Journal	Author/Authors	Learning
Supply Chain Management- A Quality Improving Tool in Process Industries	International Journal of Application or Innovation in Engineering & Management (IJAIEM) Volume 2, Issue 1, January 2013	(Mangal, 2013)	SCM and TQM are tool use for improving productivity SCM use to reducing time in transportation TQM use for safe delivery of raw material to industry
Inbound Supply Chain Methodology of Indian Sugar Industry	International Journal of Engineering Research and Applications (IJERA) ISSN: 2248-9622	(Journal et al., n.d.)	Improving sugar recovery by reducing time of harvesting to crushing with the help of inbound logistic
Food safety and traceability in the agricultural supply chain: using the Internet to deliver Traceability	Emerald Supply Chain Management: An International Journal, Volume 3	T.P. Wilson, W.R. Clarke(Authors, 2007)	Using communication technologies and computer for safe delivery and reduce time for delivery

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RFID technology in manufacturing and supply chain	International Journal of Computer Integrated Manufacturing	(Liukkonen, 2014)	Traceability and information management for electronic product using RFID technology
RFID opportunity analysis for leaner manufacturing	International Journal of Production Research Vol. 48, No. 9, 1 May 2010, 2745–2764	(Brintrup et al., 2010)	Managing supply chain management and time effort
Business excellence through total supply chain quality management	Asian Journal on Quality Vol. 13	(Rashid & Haris Aslam, 2012)	Combination of quality management and supply chain management make total supply chain quality management

VIII. CONCLUSIONS

A proper organize supply chain is usually important in food processing industry. Supply Chain Management is a systematic approach to improve the total productivity of food processing industries by reducing timing, providing quality raw material flow from farm to industry, review has been conducted on various properties which affect harvesting and transport issues in food processing supply chains, harvesting is done as per maturity period of food and then transportation for safe delivery and lower time to milling with the help of RID technology and supply chain management. SCM and RFID are the ways to improving productivity reducing lead time of crushing to mill.

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