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The Impact of Food Supply Chain Management on Food Safety

Jyoti Pawar, Manisha Mali
Department of Computer Engineering, Vishwakarma Institute of Information Technology, Pune, India

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ABSTRACT

Food safety is top priority for a lot of industries right now, maintaining food security has become difficult when it comes to customer demand. The food put on the market has to be of good quality and safe for use, as well as not be a source of any infection. For this reason, securing food safety and quality is a matter of the responsibility of food producers and governments. During the process of distributing food products it will go through all stages of the supply chain, i. e. all processes from farm to the consumers' tables, is to achieve full supervision of food safety in the modern world, because the journey leading from food production to the consumer is very time-and space consuming. There are many dangers of food during the transport, food storage, or food preparation. In order to enable food quality and sanitary safety of food products, companies have to follow rules and regulation, standards, and norms at every stage of the supply chain. The aim of this paper is to show how food safety is important and the ways in which industry ensures a temperature level that different kinds of food products require.

Keywords: Food Safety, Food Producers, Supply Chain, Agrifood, Wastage

I. INTRODUCTION

FSCs have a modernization of the food system, characterized by the development of supply chains based on long-distance trade.

Resistance consists within the incontrovertible fact that , by selling on to consumers, farmers bypass intermediaries and thus can develop autonomous marketing strategies supporting differentiation. These strategies give farmers the likelihood of keeping a much bigger share of the value-added within the farm and within the local economies.

Food Supply Chain Management (FSCM) has been coined to depict the activities or operations from production, distribution, and consumption so as to keep the safety and quality of various food under efficient and effective modes. The differences of FSCM from other supply chains such as furniture logistics and supply chain management are the importance reflected by factors like food quality, safety, and freshness within the limited time, which make the underlying supply chain more complex and difficult to manage.

II. Supply chain management for the food industry

FSCM is a basis for manufacturing, processing, and transforming raw materials from major activities such as forestry, agriculture, and so on. Identify the relationships among different items, Interpretive Structural Modeling (ISM) was used to establish a hierarchical framework. understand the interactions. The ISM-enabled framework was also used to support risk management in identifying dependencies among food supply chains and risks at different levels. It is a structure in FSCM through a step-by-step process on several manufacturing stages. Information plays an important role in making FSCM more efficient.

A. Aspects of risk management

There are many factors such as weather, infrastructure issues, or damage to a supplier location impacting the food industry. Losing a dependable supplier can impact the quality and consistency of foodservice providers. Devising risk management strategies like ensuring insurance protects the products can help the corporate avoid such losses. Brand innovation: Consumer demands keep evolving within the food industry.

1. Brand innovation

Consumer demands keep evolving within the food industry. Firms must have to change trends and incorporate innovation in their products and packaging as a part of risk management to avoid losing customers to competitor brands. They should also develop new types of packaging, a wider variety of flavors and have facilities dedicated to organic, allergy-free foods.

2. Product quality

Ensuring product quality is a crucial aspect of risk management for food companies. Customers expect their products to be safe and fresh no matter how long the availability chain. Companies, therefore, must compete to the simplest of their abilities to supply high-quality perishable goods at rock bottom possible cost while improving on-time delivery performance.

B. Aspects of Food Supply Chain Management

In this section, we present related work using various models for considering five major aspects like food quality, supply chain efficiency, food waste, food safety, and value chain analysis.

1. Food quality

The food placed on the market has got to be of excellent quality and safe for consumption, also as not be a source of disease and infection. So as to enable food quality and sanitary safety of food products, companies need to follow legislation, standards, and norms at every stage of supply chain

2. Supply chain efficiency

Reducing losses in the supply chain have the potential to save production costs and increase profitability for farmers and companies. There are a variety of techniques, technologies, and investments that can enable farmers to grow more 'crop per drop' of water, with the potential for improvements vast.

3. Food waste

Analyze your supply chain and improve visibility Understand your processes and make intelligent modifications Stay efficient and enhance collaboration

4. Food safety

The food supply chain is particularly complex to manage. These new regulations also offer a chance for stakeholders across the industry to enhance food safety supply chain management by leveraging technology to enhance compliance, make the recall process faster and more accurate, and reduce costs.

5. Value chain analysis

The value chain is a set of activities creating product values, which can make a profit. Value chain analysis

is a method that focuses on analyzing the product flow, information flow, and the way that information is managed on the whole chain.

III. IT systems for FSCM

Decision making and traceability

In FSCM, decision-making such as planning-scheduling, fleet management, collaboration, integration is also widely used in the food industry. Traceability of a food refers to a data trail that follows the food physical trial through various statuses.

IV. Implementation of FSCM

Simulation-based modeling studies mainly focus on establishing various simulation models which adopt different types of data such as product quality, customer demand for different decision-makings and predictions. In order to satisfy increasing demand on food attributes like integrity and variety , Vorst et al. proposed a simulation model which is based on an integrated approach to foresee food quality and sustainability issues. FSCM is becoming more complex and dynamic due to the food proliferation to meet diversifying and globalizing markets. It is found that food supply chain actors should provide differentiated information to meet the dynamic and diversified demands for transparency information. As a wide application of Auto-ID technology for tracking and tracing various items, traceability data plays an important role in supporting FSCM. Folinas et al. introduced a model which uses the traceability data for simulating the act guideline for all food entities during a supply chain. The assessment of information underlines that traceability data enabled by information flow is significant for various involved parties in the food supply chain to ensure food safety. This paper finds that direct-to-consumer sales of food are greatly affected by climate and topography which favor perishable food production.

A. The key process in the implementation of FSCM

1. Dispute Management: The key to dispute management is to record the dispute the customer has and to resolve the dispute in a timely manner. Disputes are often raised manually or automatically a well-designed solution can control the automation of dispute creation, however, an honest workforce is required to make sure manual disputes are raised correctly. If the dispute isn't created correctly the resolution time increases and reduces the benefit to the customer. When designing a solution for dispute management KPIs need to be determined to control the resolution time of disputes as well as the volume of disputes that are being raised. Within Dispute Management various business users could be involved in resolving a dispute, the various different scenarios need to be defined to ensure the correct business user is chosen for the correct even. This could be controlled via some sort of the workflow to send disputes to different business users counting on the plant, dispute reason code, or customer. This means that the design of the workflow will be critical to the success of the implementation.

2. Collection Management: Within Collections Management the critical business process is to ensure prioritized customers are called to maximize the volume of cash that is collected. The key to the design is to make sure the critical customers are on top of the collections worklists so the collections team can call them in a timely manner. This could be the customer with the very best credit risk, the customer with the very best outstanding balance, or the customer who has had failed promises to pay. The design of the collection strategy is a critical success factor for the implementation. To ensure the design is correct for the individual customer the implementing team needs to look at the current pain points for effective cash collection. Customers may need to be grouped, and the customers that the cash collection team currently manages may need to be reviewed so that they can be distributed in a different way.

V. Current challenges and future perspectives

A. Supply chain network structure

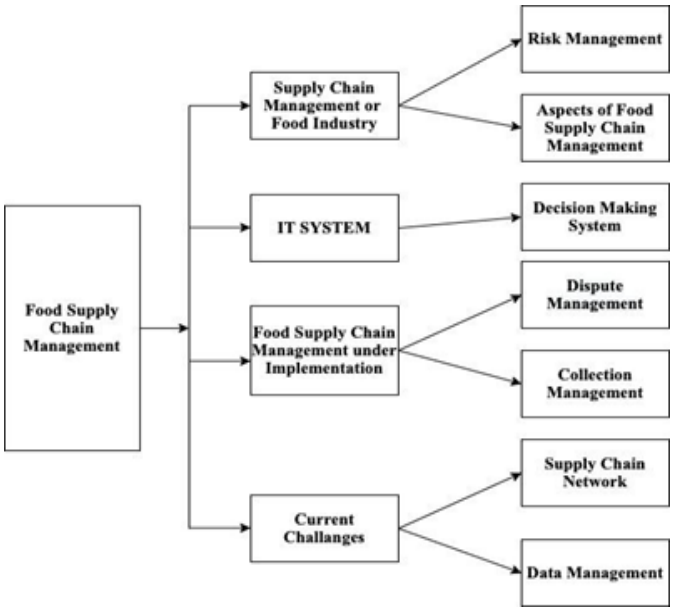

Fig.1. Food Supply Chain Management: System, Implementation, Challenges and Future Scope

B. Data Management

Data Management provides unique insights by:

1. Bringing all your data points into one, centralized location from one test to yearly trends; understand your data ecosystem by harmonizing content from internal and external labs into one location

2. Enabling collaboration – work together with your plants and suppliers in real-time by tracking interactions and finding the proper contacts when there's a problem

3. Visualizing issues and opportunities – with your data harmonized it becomes easy to layout interactive graphs to get to the heart of an issue or to help you tell your story.

4. Improving your response time – instant access to data keeps you recent on all of your product information and allows you to react immediately to issues that are discovered.

C. Solution For Real World Problems:Supply Chain and Artificial Intelligence (AI)-based solutions for performance improvement and public Safety. In the implementation of computer vision image processing solutions combined with the planning, deployment and management of enterprise mobility solutions like Human Free Vehicle and Container Recognition, Automatic.Identification and Data Capture (AIDC), Mobile Cloud Analytics, RFID (Radio Frequency Identification), and proprietary Mobility software.We have to implement AI technology to supply real-time surveillance and monitoring for Homeland Security , traffic & parking management, enforcement and access control applications also as supply chain management.

2. Protection for Product and Brand across the Supply Chain:Protection for Product and Brand across the Supply Chain: While many programs and systems have been developed and implemented with varying degrees of success, we believe it is incumbent on all of the food segments within the U.S. to protect their customers and companies through their own comprehensive programs.

Every step along the food supply chain must be held in charge of what they provide or handle. It is essential to know and believe that your immediate source of supply also has conducted a preventative controls assessment as characterized within the FSMA. Members of the availability chain must have a transparent understanding of the assembly and processing controls necessary also as have them functionally verified and validated to deal with the hazards which will be related to the foods they handle both up and down the availability chain. Experience has shown that you can't simply rely on a certificate of analysis (COA), supplier specifications or someone else's portrayed activities and knowledge.The Peanut Corporation of America spread recall may be a quintessential example of an ingredient that ended up in thousands of processed products over multiple brands that were recalled over a 6-month period.

Key Areas to be Addressed:

The following are two areas that should be addressed in any company's food safety program:

a. Development of updated, comprehensive specifications

Activities should start with the event of comprehensive specifications. Without well-thought-out specifications, comprehensive purchasing agreements and supplier review programs can't be developed. Specifications must be developed with input from all applicable departments, including food safety, development , purchasing, operations, logistics and risk management. Hazards should be identified and addressed. If a proven intervention, such as irradiation for spices, is available, use it.

b. Development of comprehensive purchasing agreements.

This is one area that's often overlooked by the food safety professional who won't be involved in the event or review of the agreement. Input from the food safety professional is significant regarding what's required of the supplier to attenuate risk. The first area must be that the products suit all of the federal rules and regulations regarding food or ingredients imported into the U.S.

Fig. 2. Supply Chain Management

VI.CONCLUSION

Food supply chain optimization is continuously changing in par with the development of new technologies, and environmental and social change. Social, environmental, and economic pressure also will change food demand and can influence the kinds of foods and presentations which will be produced.

- Advanced technologies like Big Data Analytics, Cloud Computing, and IoT will be employed to transforming and upgrading FSCM to a smart future;
- Data-driven decision-makings for FSCM would be adopted for achieving more sustainable and adaptive food supply chain; and
- FSCM implementations will be facilitated by the cutting-edge technologies-enabled solutions with more user friendliness and customization.

Today's Supply Chain Management, division or group is tailored to the level that the company needs. Supply Chain overall main functions is (Procurement, manufacturing, distribution, retailing etc.) can be done differently and categories as fits each firm. A good formulation of supply chain entity results in supply chain success that leads to organizational success. The cooperation between purchasing, materials planning and logistics should result in an efficient and uninterrupted flow of products.

Since improvement in any sector is a continuous process, the research may continue to incorporate new issues and supply chain practices in meeting challenges of quality sensitive globally competitive processed food sector. The organizations ought to be continually developed and adjust to the dynamic business environment for their survival.

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