

# MANIFEST

A MONTHLY NEWSLETTER BY CII SCHOOL OF LOGISTICS,  
AMITY UNIVERSITY, NOIDA



## Director's Note

DR. ANITA KUMAR

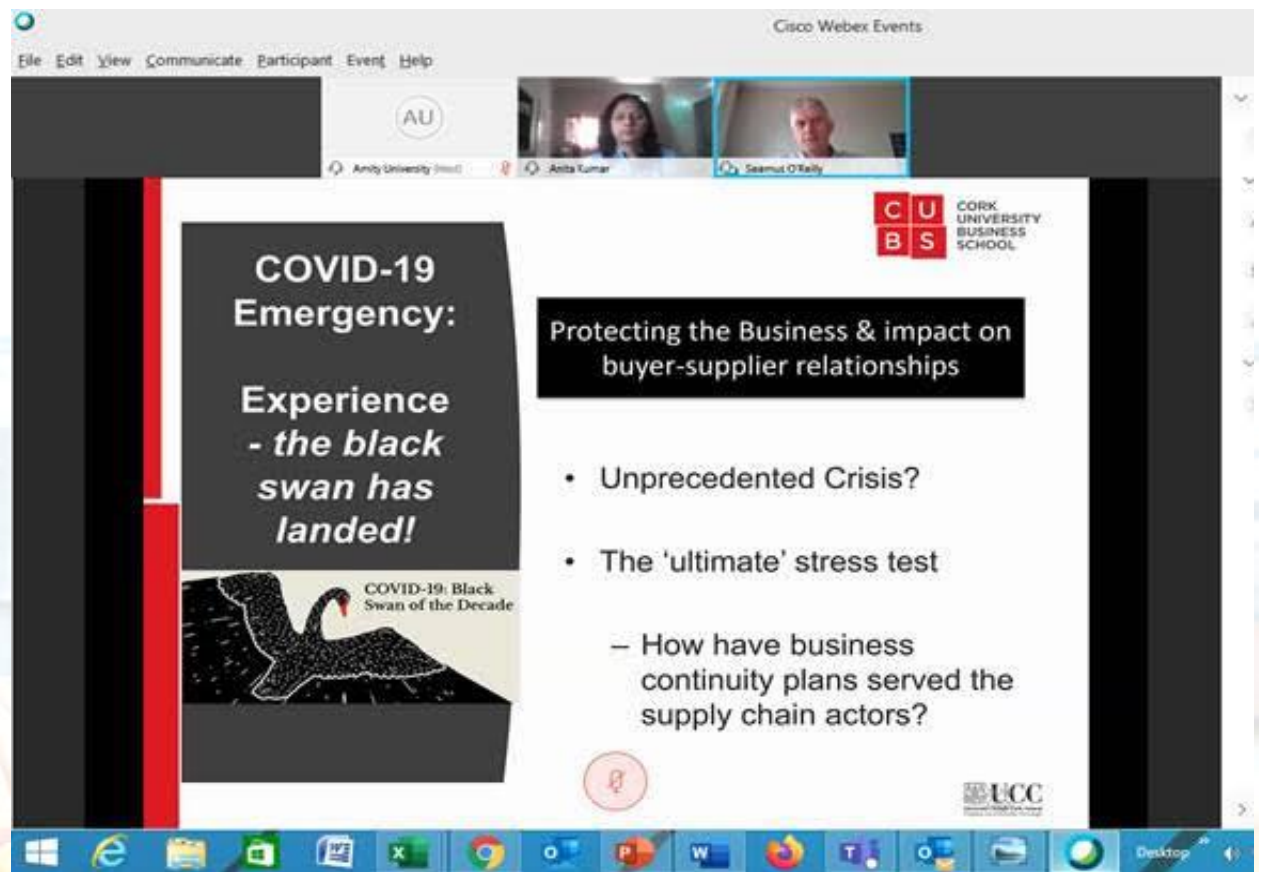
Hello everyone!

In this issue, we discuss a very important theme: Food supply chain management and Logistics in India. It makes me very proud to state that during a month-long complete lockdown announced by the Government of India to combat the Covid-19 Pandemic, food logistics has been very active, transporting fresh produce, milk and dairy products and grains to every part of the country, feeding 1.3 billion people every day. Both urban and rural areas have not experienced any shortages of essential commodities, thanks to the efficient food supply chain management in India. It is also highly commendable that many NGOs, religious groups, and government undertakings have been distributing free ration and cooked meals to the poor and needy, day-in-day out.

No wonder India is called the Food Bowl of the world as we are amongst the largest producer and exporters of fruits & vegetables, milk, wheat, spices, rice, tea, coconut, jute, and many more. Live our tradition of caring and sharing food. Stay safe and Happy reading!



Download Aarogya Setu app to get Covid-19 updates launched by the Government of India.



Snapshot of a webinar conducted by Dr. Seamus O' Reilly, Director SCM programs, University College Cork, Ireland organized by CII Sol, Noida on impact of Covid-19 on Food Supply Chain Management.

## CII School of Logistics enhances Remote Learning

TRISHA MANRAI

A nationwide lockdown ordered by Prime Minister Narendra Modi in late March due to the evolving COVID-19 situation has changed the scenario of teaching and learning. The pandemic has had a worldwide effect in the previous weeks and keeps on affecting most of the parts, with the education segment being one of the most influenced ones. Students over the world are losing significant time in their education because of the lockdown forced.

As the institutions are closed, to support the students' learning, the institution members are working together to deliver the education-online. Also, educational institutions are introducing online courses and some education technology startups are temporarily offering free classes to help offset the impact of its closures. There are various internet learning openings which you can access from your homes, along these lines utilizing this lockdown period for your skill enhancement.

As CII School of Logistics, Amity University, Noida is also taking big steps towards educating their students online during this difficult global situation. CII is organizing Webinars and online workshops to provide their students the best they can. It is giving easy access to all the students located in pan India to connect to these classes though the app- Microsoft Teams. Online classes increases the chances of a student performing well due to the maximum time their instructors give them. This also enhances their problem-solving and communication skills. Teachers can control the learning environment, which ultimately helps you develop a deeper understanding. Webinars organized by the school are helping students to make contact in the real world by interacting with industry members in the field of *Logistics and Supply Chain*. And also they are getting expertise that helps them to have access to education that is not readily available in certain geographic locations.

## INDUSTRY'S VIEW

## FOOD AND BEVERAGE SUPPLY CHAINS

RAJEEV RANJAN

Food and Beverage is the top item in Indian and global household consumption basket. Globally food, beverage, and grocery industry is estimated to be worth about \$11 trillion. Indian F&B sector is \$560 Billion and India's Food and beverage processing industry is estimated at \$180 Billion and employs over 16.5 million people.

Food processing industry is in the business of facilitating processing, preserving, packing and transportation of raw materials and Processed food items from farm to the hands of consumers. Food processing industry is classified into Primary and secondary processing. Simpler Processes like cleaning, grading, sorting, packaging are classified as **Primary** processing. Finished products made through primary Food processing is Packaged milk, packaged Fruits and vegetables, pulses & spices, Flavor and salts etc. **Secondary** processing requires more complex and advanced processing. Product like packaged drinking water, aerated soft drinks, packaged fruit juices, Alcoholic drinks, confectionery, chocolates, jams and pickles, bakery products, Ghee, cheese and butter etc. are product of Secondary Food processing

Given the size of this industry, many companies are competing in this space to win consumers share of wallet. Top few names are Amul, Godrej, Dabur, PepsiCo, Coca Cola, Nestlé, Britannia, ITC, Parle, Mondelez Hindustan Lever, MTR Foods. Few top global F&B player, are Nestlé, PepsiCo, Coca Cola, JBS, Archer Daniels Midland Company, Anheuser Busch InBev, Mondelez, Sab Miller, Tyson Foods, Cargill, Mars, Unilever, Kraft, ConAgra Foods.

Owing to seasonality, large quantities of agricultural produce gets generated post harvesting in a short period of time. Given perishable nature of agri produce, the **efficiency of F&B supply chain becomes extremely important** in ensuring hygienic and safe storage, handling and processing & packaging so that processed food is good for longer period of time, there is minimal wastage and it is absolutely safe for human consumption.

## Key Features of F&B Supply Chains

- **Food safety:** Since food is processed and packed for direct consumption by human, food safety is one of the top priorities for F&B supply chains. Any kind of contamination at any of "sourcing-processing-storage-delivery" leg of supply chain can result in significant health risk to consumers and permanent damage to brand & company reputation. Through well-defined SOPs and comprehensive quality control protocols, companies ensure product safety in end-to-end supply chain. All the forms of microbial life, including fungi, spores, viruses, and bacteria are either killed or deactivated during the manufacturing process to ensure food is safe for human consumption. This is achieved through **Pasteurization/Sterilization/Blanching/Retorting** processes. These are processes through which food is exposed with heat or pressure or electronic beam for a specified contact time to deactivate specific micro-organisms or enzymes, thus making them safe for consumption, minimizing any quality changes in the foods themselves and delivering requisite shelf life. Similarly, due care is taken to ensure no possibility of product spoilage during storage, handling and transportation leg of supply chain.
- **Storage and Handling conditions:** Each of the ingredients that go into making of packaged food has a shelf life after which it is no more fit for use. These ingredients require specific temperate/pressure and humidity for storage and for preserving their contribution is taste, favour and mouthfeel of final product. To minimize wastage, food supply chains have temperature-controlled warehouses in factories and in distribution chain, in addition to temperature-controlled transportation infrastructures. Usual temperature-controlled zones are **frozen zone, refrigerated zone and ambient zone**. These infrastructures are expensive to install, maintain and run. Inventory management, specialised handling requirement and incremental costs of cold chain brings in added complexity and challenges in managing food chain vis a vis non-food.
- **Regulatory Compliance:** Food companies prevent the possibility of hazards by institutionalizing preventative process (temperature, pressure humidity, contact time, turbulence, concentrations etc.) controls in their sourcing, manufacturing and distribution processes. Country specific regulations need to be complied with by F&B companies. *Hazard Analysis and Critical Control Points (HACCP)* of Europe has set guidelines and principles on producing healthy and safe food and requires companies to identify *Critical Control Points (CCP)* for the presence of physical, chemical, and bacterial hazards to food. In **India**, **Food Safety and Standards Authority (FSSAI)** works towards setting standards for safe and hygienic food. In USA, *Food Safety and Inspection Service (FSIS)* is responsible for the safety of meat, poultry, and processed egg products and *US Food and Drug Administration (FDA)* is responsible for virtually all other foods. The *FDA Food Safety Modernization Act (FSMA)* ensures safety in the U.S. food supply by shifting the focus from responding to contamination to preventing it. Muslim boards require HALAL certifications of infrastructure. In addition, contents printed on label and on secondary packaging cartons are also regulated by country specific guidelines and it varies substantially across countries. Customs of different countries specify different freshness levels before product is permitted to enter that country. Achieving regulatory compliance can become a daunting task, especially for firms with global operations F& B supply chains that need to source of ingredients from multiple countries and that service processed foods to customers across border in international markets, manage the huge complexity and cost associated with varying statutory and regulatory requirements of countries.
- **Product Freshness:** While pasteurization makes food safe for consumption for a longer period of time, since food is at its best when it is fresh, **supply chain "flows" and "processes"** are designed to put the product in the hands of retailer or consumer in minimum number of days after manufacturing. Based on study of demand and supply variabilities, **multi-echelon inventory optimisation techniques**, agile optimal lot manufacturing and reduction in replenishment time are some of the techniques used in supply chain operations to keep bettering product freshness.

- **New Product Developments (NPD):** Several new trends are emerging in behavior of food and beverage consumers viz convenience in usage, shift to natural ingredients, no preservatives, non GMO, high-protein foods that promote longevity, healthy snacks, tasty alternatives to sugary treats, foods that offset any food allergies or sensitivities, ascent of meat free and veganism etc. Food consumers are also becoming more daring when it comes to trying out new flavor combinations. This necessitates new product introduction as a requirement to being competitive in F&B business. Thorough and in-depth **understanding of raw materials** and ingredients w.r.t regulations, their functional, nutritional and health properties, their behavior and stability under processing conditions exposed to during manufacturing, storage & distribution is essential. Other considerations are **availability** (location, quantity and time of the year), its **impact on taste, flavor, color and mouthfeel** of final product made using these ingredient, **micro-biological stability** and its compatibility with **packaging material** in which food is packaged. Supply chains with a strong NPD capability have proven to be a source of competitive advantage for organizations.



An illustration showing *Food and Beverage Supply Chain*  
Source: Google Images

- **Environment Friendliness:** Agriculture which is primary source of input to F&B industry is the largest consumer (70%) of freshwater withdrawals from watercourses and groundwater. This also contributes to water pollution from excess nutrients, pesticides, and other pollutants. Intensity of water consumption used for cleaning and processing in F&B is 1: 2 to 3. Efficiency in consumption of water must be maximized across the value chain to reduce **water footprint** for the final product. **Primary packaging** of food is done in plastic or can or laced cardboard or glass containers. Packaging adds substantially to F&B's **carbon footprint**. Same goes for intensity of energy used in value chain. **Consumers want their foods to be produced sustainably**—six in 10 consumers identified sustainability as a priority. Progressive F&B organization's supply chain is laser-focused on reduce- reuse- recycle and lower harm to environment. Initiatives around ruthless reduction of resin quantity in preforms, thin gauging of Aluminum cans, lids and glass, aggressive reduction in virgin paper in cardboards, paper based straws, bagasse based caps and closures in place of plastic, reducing km travel per unit of sale, maximizing collection and recycling of used plastic/can/glass/cardboards are some of the initiatives organizations are working to improve sustainability quotient.
- **End to End Visibility:** To monitor food safety till last point of sale and to ensure organization has the ability to respond quickly and accurately in case of consumer concerns, food supply chains invest in technology and people capability to have end to end visibility. A control sample of every batch of production is kept till the full shelf-life of product. All the critical parameters under which food was processed, stored and transported are meticulously tracked, recorded and stored. This is also true for all the raw materials and ingredients that go in the product. In case of any consumer concerns, these parameters are analyzed by experts, using structured **problem-solving techniques** like DMAIC, DMADV, Lean Six-Sigma, to find the root cause of the problems and action plans are enacted by organization accordingly to prevent re-occurrence. End to end visibility, in addition, also helps in looking at the supply chain end to end and driving efficiency respecting global optima. Consumers want brands to be transparent about whether their foods contain any artificial ingredients, as well as information on where raw materials and those ingredients are sourced from. 7 in 10 consumers would trade their favorite products for alternatives that didn't contain artificial ingredients, and more than half are willing to pay more for them. End to end visibility helps organizations in giving fact-based assurance to consumers and helps in earning their trust.

Close to 30% of food products produced in India, valued at \$14 Billion, gets wasted before it reaches the hand of consumers. The reason are bottlenecks in Food Processing infrastructure and bottlenecks in supply chain. According to the *United Nations*, food production will need to grow by as much as **70%** by **2050** in order to feed the **9.7 billion people** that are expected to be living on the planet by then. In order to address this challenge, not only will more food need to be grown and produced, but Food & Beverage (F&B) industry supply chains need to vastly improve efficiencies so that the increased volume of food can be safely processed, stored and delivered and wastage are eliminated. Exciting and challenging times for F&B supply chains and supply chain professionals.



## Rajeev Ranjan

<https://www.linkedin.com/in/rajeevranjanko/>

Integrated (Procurement, Manufacturing and Logistics) Supply chain leader with 15+ years of FMCG and Food & Beverage experience. Have managing portfolios up to \$350M and led multi-location teams of ~400 associates. Delivered over \$100M cost savings while leading (and building) high performance teams in India, Singapore, South East Asia and China.

Speaker at Supply chain and Route to Market Industry forums/conferences/podcast in India, SEA.

## PROFESSOR'S DESK

# Changing Landscape: Agri-food Storage and Logistics in India

DR. ANITA KUMAR

Agriculture, with its allied industries, is still the most prominent sector in India as nearly 60 percent of its rural households depend on it for their livelihood. Ironically, India is the largest producer of many agri-food products such as milk, jute and pulses, and second-largest producer of rice, wheat, sugarcane, cotton, groundnuts, tea, fruits and vegetables, yet it accounts for 194.4 million undernourished people. The agri-food production in India is resource intensive, cereal centric with enormous post-harvest losses, making it commercially not viable for farmers.

In the last decade, there is increased awareness and research on India's post-harvest losses that are estimated to be ~ \$7.5 billion (FAO 2019) due to inadequate food processing infrastructure and poor storage and logistics facilities. For instance, in the previous years, 21 million tonnes of wheat (approx.) perished in India almost equivalent to the entire wheat production of Australia. The procurement system had failed to cover the entire country evenly as on an average, a farmer in India travelled 12 kms to reach the nearest *mandi* and more than 50 kms in North East India as compared to the global average of 5 km radius. Formation of long marketing channels and profit sharing with multiple intermediaries, added to the woes of the producers leading to cost inflation of ~250% approx. Thus, principal stakeholders in the agri-food supply chain namely farmers and consumers were losers in the supply chain as farmers did not get enough compensation for their efforts and consumers ended up paying unjust inflated price.

As the government of India is the largest buyer of rice, wheat and pulses through the Public Distribution System (PDS), there have been many government schemes to improve and regulate food grain procurement, warehousing and logistics systems and address the issues plaguing this sector. Even private players have come forward to bring new technologies and innovative solutions to reduce post-harvest losses and generate efficiency in the agro-food supply chain ecosystem. This article highlights the key initiatives taken by both government bodies and private enterprises, working in collusion, to develop better agri-food warehousing and distribution systems in India.



Figure 1

## Food Grain storage

For the past five decades, public sector agencies such as FCI, Central Warehousing Corporations (CWC) and the various State Warehousing Corporations (SWC) controlled the warehousing and distribution of food grains with limited capacity, located mostly in North India. The commonly used storage methods were open and *cover and plinth (CAP)* storage, which were economical, but loss of grains was inevitable as there was very little control on the micro climate (exposure to floods, rains and leakages in the godowns) and pest infestations. In addition, the storage capabilities were poorly maintained with inadequate quality control measures. However, in the last decade, *Food Corporation of India (FCI)* has taken steps to thoroughly modernise its assets in line with Govt's commitments under *National Food Security Act (NFSA)*. New warehouses with steel silos have been constructed through the *Private Entrepreneurs Guarantee Scheme (PEG)* and *Public Private Partnership (PPP)* illustrated in *Figure 1*.

194.4<sub>MN</sub>NUMBER OF  
UNDERNOURISHED  
PEOPLE IN INDIA~ \$7.5<sub>BN</sub>INDIA'S POST HARVEST  
LOSSES ESTIMATE40<sub>MN</sub>TONNES OF GRAINS  
TRANSPORTED  
ACROSS INDIA  
ANNUALLY

Some of the advantages of the modern silos are:

1. **Mechanised handling** of food-grain leading to reduced wastage
2. Controlled **fumigation** & in-built **temperature control** mechanism leading to reduced pest infestation and increase in shelf life as unpacking of grains is not required in initial stages
3. **Mechanised loading** and un-loading of grains to improve efficiency.
4. Specialized **transport wagons** for ferrying of goods preserves spoilage during transportation (wagons provided by the Ministry of Railways)
5. Reduced **land requirement** (30% less) as compared to traditional godowns for similar tonnage.

Thus, construction of modern silos has created a win-win situation for both farmers and government as there is reduced pilferage by automation and elimination of middle-men leading to higher income for farmers and quality in grain storage and distribution.

## Agri-food Transportation

The first mile is usually covered by the farmers on bullock carts as they deliver the grains to *mandis* and government warehouses (*Figure 2*). From there, more than 40 million tonnes of food grains is transported across the country every year through various modes such as rail, road and ships (Andaman & Nicobar Islands, Lakshadweep) and through coastal shipping and riverine movement (Kerala and Agartala). FCI ensures that safe and protected movement of food grains is undertaken from surplus regions to deficit regions and create buffer stocks in the deficit regions



Figure 2

Apart from the government initiatives, various private players are investing in transportation and logistics of food grains, fruits and vegetables. For instance, *ColdStar Logistics* provides customized solutions for cold storage and refrigerated transportation across India for fresh and frozen commodities. Their services include specialized refrigerated storage warehousing, transportation, distribution and logistics. *LEAF* is another player which works with smallholder vegetable farmers in South India. The company provides integrated cold chain logistics comprising post-harvest transport, cold storage, processing, and supply through refri-trucks to the distribution centres and retail stores. *Star Agri*, *Sohan Lal Commodity Management*, and *Shree Shubham Logistics* are other comprehensive agri-logistics solutions players providing services across the spectrum.

Several other B2B models that directly connect farmers with the bulk buyers via online and mobile platforms are also increasingly becoming popular. These models enable key stakeholders to bypass the long chain of intermediaries and reduce information asymmetry. Riding on the high mobile penetration, *TCS' mKRISHI* platform offers personalized advisory services to farmers, via mobile phones (SMS and IVR), enabling them to access important information on pesticides, fertilizers, soil and water conservation, and improving access to markets for them. *Logistimo* is a hosted web service for agri-food supply chain management, accessed via basic mobile phones and web browsers, making it uniquely suitable for rural markets. *ITC's e-Choupal* and *Choupal Sagar* are two electronic platforms solely devoted to the upliftment of farmers.

Thus, the agri-food distribution in India is undergoing rapid transformation and it is hoped that government and private enterprises collectively will be able to reduce post-harvest losses and ensure food security to every citizen of India in the near future.

Reference: <https://in.one.un.org/who-we-are/fao-india/>

STUDENT'S DESK

## Food Processing Industry: The New Sunshine

LT COL V SUNIL KUMAR

India being an agrarian economy specializes in food processing industry. This being attributable to the socio cultural, geographical, economical & culinary aspects of the society. Although modern food processing techniques may have their own benefits but suffer from lack of trust, lack nutritional value and taste. Secondly, the aspect of use of preservatives and food additives are common in the food processing industry which can be fatal in some situation.

The global trade in food products has tripled in the last decade. During this time, the global food supply chains have increased in complexity and a much greater range of products is traded internationally. Developing countries have taken an opportunity to boost their economy. In the long, complex supply chains, it's vital that food is kept safe, is of good quality and is suitable for consumption when it reaches the consumer as per [Food safety](#) standards and regulations. [Trade is closely linked to food security, nutrition and food safety](#). It influences agricultural output, the variety, quality and safety of food and the composition of diets. Globally accepted standards enable trade by making it more transparent and efficient

The Food Processing Industry procedures have different National as well as International Authorities as regulatory bodies for monitoring & quality control.

### a) National.

- i) The **Food Safety and Standards Authority of India (FSSAI)** is the zenith food regulator. It is empowered the Ministry of Health and Family Welfare, Government of India. The FSSAI implements and enforces food processing rules as prescribed in the Food Safety and Standards Act, 2006 (FSS Act). The FSS Act is an Act of Parliament, popularly referred to as the food Act. Though the Act continues to confirm it desires to be extra harmonized with standards of global corporations for international parity.
- ii) **Food Products Order (FPO)** which was promulgated under Section 3 of the **Essential Commodities Act 1955**. Food process order or **FPO mark** has been issued by the Ministry of Food processing industry which also states the standards for this mark. **FPO** intends to regulate sanitary and hygienic conditions in the manufacture of fruit, vegetable products. **FPO mark** is a certification mark which is compulsory for each and every processed fruit products that are sold in India
- iii) The **Bureau of Indian Standards (BIS)** is the national Standards Body of India working under the aegis of [Ministry of Consumer Affairs, Food & Public Distribution, Government of India](#). It is established by the Bureau of Indian Standards Act, 1986 which came into effect on 23 December 1986. The organization was formerly the **Indian Standards Institution (ISI)**, set up under the Resolution of the Department of Industries and Supplies No. 1 Std.(4)/45, dated 3 September 1946. The ISI was registered under the Societies Registration Act, 1860. One of the major functions of the Bureau is the formulation, recognition and promotion of the Indian Standards

### b) International.

- i) The Codex Alimentarius Commission(CAC)is an international food standards body established jointly by the Food and Agriculture organization (FAO) and the World Health Organization (WHO)in May 1963 with the objective of protecting consumer's health and ensuring fair practices in food trade. The Agreement on Application of Sanitary and Phytosanitary Measures (SPS)of the World Trade Organization (WTO) recognizes Codex standards, guidelines and recommendations as reference standards for international trade and trade dispute settlement. Currently the Codex Alimentarius Commission has 189 Codex Members made up of 188 Member Countries and 1 Member Organization (The European Union). India became the member of Codex Alimentarius in 1964.
- ii) Major Indian and Overseas Players in the Food processing industry are:  
ITC Limited , Parle Products Pvt. Ltd. Amul ,PepsiCo India Holdings, Nestle India Pvt. Limited. ,Britannia Industries Limited, Dabur India Limited, Hindustan Unilever Limited.

Several issue have marked their deep impression on food and its related industries. For e.g. **Maggi by Nestle**. In May 2015, food safety regulators from [Barabanki](#), a district of [Uttar Pradesh](#), India reported that samples of Maggi 2 Minute Noodles had unexpectedly high levels of [monosodium glutamate](#) (MSG), as well as up to 17 times the permissible limit of lead. This finding subsequently led to multiple market withdrawals and investigations in India and beyond. The move led to large scale ban on consumption of maggi all across world. **Haldiram's**, After being subjected to the allegations of pesticide adulteration, Haldirams snacks were refused admittance into USA by the country's Food and Drug Administration (FDA) in 2015. Undergoing a comprehensive inspection for the possible excess lead levels, the company was given a clean chit by the Maharashtra FDA.

Processed food in India will continue to stay so long as we see changing lifestyles, increasing numbers of working women, disposable incomes and trendy attitudes. Besides, the government is keen on encouraging this industry by promoting joint ventures, giving industrial licenses, introducing schemes for technology upgrade, and establishing and modernizing processing industries. In conclusion, the future of the food processing industry is dazzling, with food safety, quality assurance and hygiene norms gaining importance. The stringent rules laid by the government are sure to take this industry to global standards.

## LOGI-TOONS Series #2



Illustration by Karan Bhutyani (CII- Sol, 2017-19 batch)

## The Transformation

Adapted from Emily Fisk

There was once a man named Manning  
 Who performed Sales & Operations Planning  
 He lacked the support and information required, so sadly  
 He performed it very badly.  
 He worked in a silo and no matter how much he tried  
 Without help, his problems multiplied  
 On a bright sunny day, he stumbled upon Vendor Managed Inventory  
 The answer to his prayers, the eliminator of excess in the pantry  
 All supply chain information and simulation in one place  
 His supply and demand gap disappeared without a trace  
 Using tools like Rapid Response and CPFR  
 His Sales and Operations Planning took him very far

## An Ode to Supply Chains

Adapted from Alexa Cheater

O supply chain, how I do appreciate thee,  
 always working hard to bring things to me.  
 From raw materials to finished products, and everything in-between,  
 your complexities are many, unless when you are lean.  
 Don't let anyone dismiss you or belittle your worth,  
 because without you, supply chain, nothing could ever move on Earth!

Source: <https://www.kinaxis.com/>