

DIGITIZE YOUR SUPPLY CHAINS TO ESTABLISH TRACEABILITY & ENHANCE FOOD SAFETY, SECURITY & SUSTAINABILITY



Definition of the Term Traceability: ISO 9000

Traceability is the ability to trace the history, application, use and location of an item or its characteristics through recorded identification data.

Two Requirements for this

- Identification Unit under consideration
- Record information to allow tracing forward/back

Food Traceability for Brand Value & Consumer Safety

Ensuring traceability is vital to providing transparency and building consumer trust in the content, quality and sustainability of the end-to-end food supply chain. New technologies, such as blockchain and satellite imaging, can strengthen traceability programmes and lead to better transparency and value across the supply chain.

Paul Bulcke, Chairman of the Board, Nestlé, Switzerland

Fresh food supply chains are highly complex to manage and are confronted with numerous challenging issues like seasonality in supply & demand, price volatility, fragmented suppliers, product perishability, shrinkage, laborious quality control and replenishment processes etc. In this paper, we will describe typical food supply chain challenges, various stakeholders involved, data elements to be connected. digital technologies that help to establish the connection and Tech Mahindra's Digital supply Chain solution portfolio that is certified by SAP & built on SAP Leonardo platform to bring visibility & traceability.

With COVID-19 many global supply chains are disrupted beyond the imagination. Either they have come to stand still or blown enormously with new production & transportation requirements for certain products like food, medicine etc. Restarting/realigning these supply chains to new normal needs accommodation of new operating models like social distancing, safe & secure operating procedures etc. This may bring a lot of friction & trust issues between the business partners and needs real-time visibility & traceability into much needed supplies, production & distribution networks to realign with consumer demands.

A. Key Challenges in food value chain:

1. Product quality

The fundamental issue in food supply chain is continuous and significant change in quality of products throughout the supply chain (source to final consumption) as they get exchanged between Multiple stakeholders from different organizations and exposed to changing environmental conditions. Also food products require special handling, production, storage and transportation requirements, if not maintained compromises on food safety and security.

2. Perishability & Food Fraud

Perishability of food products results in degradation and loss as the time passes and puts immense pressure on company's profitability. With increasing cost pressures, there are chances of food fraud and non-ethical business practices in supply chain. In case of any risk perception or complaint from customer, food businesses must be able to quickly remove the products from the marketplace to protect public health and safety.



"Visibility, traceability, and interoperability are essential to connected, agile and more resilient supply systems now and well beyond the immediate COVID-19 crisis."

Margi Van Gogh, Head of Supply Chain & Transport for the World Economic Forum

3. Consumer preferences

Compared to earlier times, consumers are conscious to safe and sustainable products along with details on their provenance or origin, how and where their food got manufactured etc. This makes another challenge for the companies to effectively meet the consumer requirements along with assured quality and safety.

4. Regulatory Requirements

One up & one down companies, in some cases to the source/origin tracking also required by various regulatory bodies like FSMA, FDA and country specific regulations

To address these challenges, CPG & Retail companies need a system with an ability to track & trace products and their raw materials from origin, all stages of production & distribution till consumption.

B. Key Stakeholders in the Food Value chain

To bring end to end traceability, the product flows have to be tracked through all the stakeholders involved in the food value chain. The key stakeholders with in food supply chain can be broadly classified as below. Some companies may play one or more roles depending on the horizontal/vertical integration of supply chain

1. Growers/Farmers: who grow, harvest, store & sell the produce/live-stock
2. Produce Packers/ Re-packers: who aggregate, pack, sell, ship the produce
3. Distributors/Traders: who store, sell and ship the produce
4. Manufacturers/ Processors: who Manufacture, Store, Pack, Sell, Ship the finished product
5. Third Party service providers: who transport & store through various transportation modes
6. Retail/e-tail stores: who receive, store, bundle / un-bundle, display and sell to consumer
7. Consumers: who buy the products online or through retail stores

C. What are the key data elements required for traceability in the value chain?

Various system of records & their interconnections have to be established to get end to end product traceability. Key information that need to be gathered & leveraged is described below

Product information

- Bill of Materials – Raw materials/ Ingredients, semi finished & Finished goods
- Production condition – temperature, humidity etc
- Link them to product codes & batch codes

Production & Quality information

- Production information – facility, machinery & equipment, people & inspection
- Quality test results of raw materials/ ingredients, semi finished goods, finished goods
- Quality inspection reports during production & production equipment
- Link them to product codes & batch codes

Supplier information

- Record of all ingredients, its quality and suppliers

Storage & Distribution

- Storage facilities and transportation equipment, inspection reports etc.
- Product distribution to Retail stores
- Link them to product codes & batch codes

Consumer information

- Consumer purchase of the products
- Linking the consumer to stores/ distribution channel and product batch codes through transaction history
- Typical representation of traceability for the a finished product can be depicted in figure-1 shown below by connecting the information stated above.

D. Technology components to address these requirements

Enablement of supply chains and its stakeholders with digital technologies will provide a significant shift in providing consistent and comprehensive way of data collection, aggregation and analysis of data. Key technology components include

Digital platform - IoT & Blockchain enabled platform to connect stakeholders in the value chain & immutably collect, aggregate, analyze data to provide transparency of transactions

Serialization- establish unique identifier to capture individual product level data (Ex: Barcode, RFID etc)

Sensors- to enable real-time tracking of individually identified products & their condition through various events

AI/ML engines/Bots: to continuously monitor & track patterns, predict future likely occurrence events and potential solutions

E. Tech Mahindra's Digital Supply Chain Solution Portfolio

Tech Mahindra provides Industry Platform Solutions that are co-innovated with SAP on SAP Business Technology Platform

Platform, to enhance collaboration, communication & food safety through its DSC solutions portfolio listed below:

FARMGURU: IoT enabled precision agriculture for farm and crop condition and quality monitoring

FEEDS: SAP IoT enabled, module based solution connecting all the partners in the value chain from Farm to consumer

Consumer connect: To enable mobile/handheld accessibility to consumers and other stakeholders

SPRINT: SAP Blockchain enabled, guided recall management solution to enable quick recalls & regulatory compliance

For detailed solution description, refer to "FOOD SAFETY, TRACEABILITY & STRATEGIC RECALLS – Digitalizing Food Supply Chains"

F. Potential Benefits of Food traceability

Supply Chain Traceability solutions built on tech M's DSC platform mentioned in section-E provides impact on business operations from economic, environmental, health & safety and social aspects and identify areas of potential cost saving Opportunities. Also improved visibility and traceability benefits the businesses to

- Enhance food safety & security with rapid response to Recalls/food issues
- Enhance Trust between partners and reduce risk of collision & Tampering
- Improved Consumer Confidence & Loyalty through product information transparency
- Supply chain optimization & Food loss
- Adherence & measurement of Sustainability Development Goals recommended by UNGC

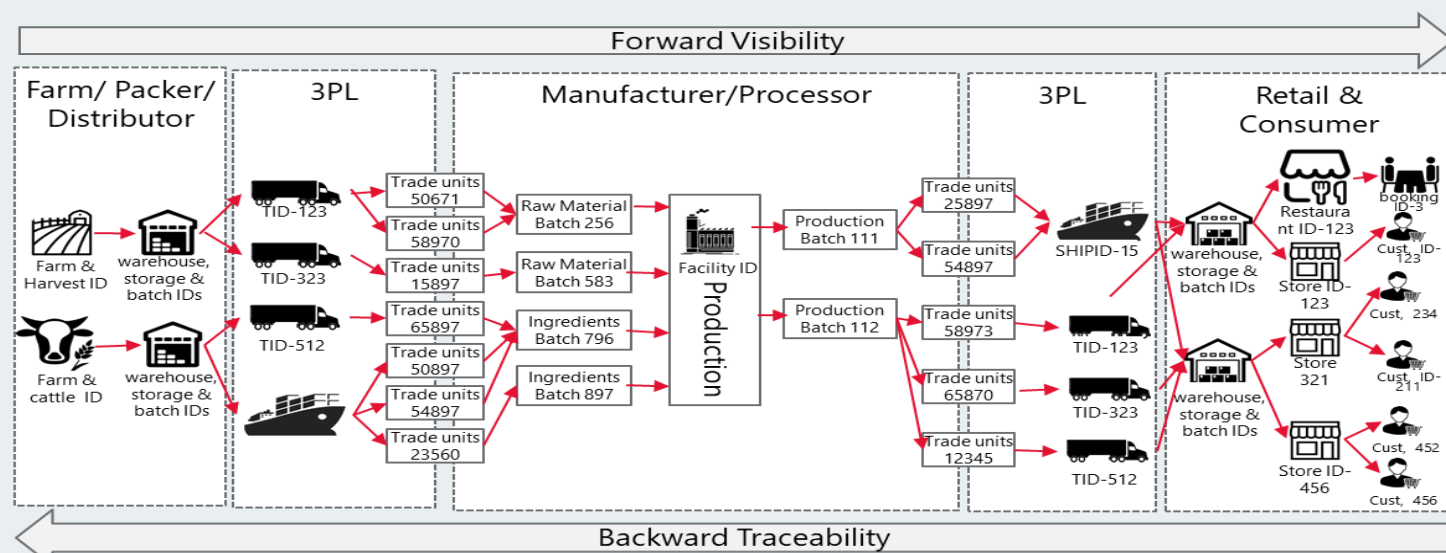
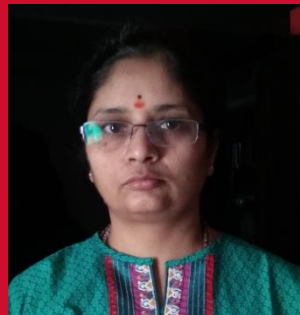


Fig-1: Depiction of establishing End to end traceability of food products

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