Woolworths Group | Implementing Food Traceability

AUSTRALIAN GUIDE TO IMPLEMENTING FOOD TRACEABILITY

Industry Case Study

ORGANIC PRODUCE

DEAKIN UNIVERSITY

These Guides provide a data framework which create end-to-end traceability.

Contents

About the project team

The Project Team consisted of representatives from...

R&R SMITH HUON VALLEY TASMANIA

Huon Valley, Tasmania, the company sells over a million apples each year, supplying to Woolworths supermarkets under the Macro organics brand. The Company operates its own orchards and operates a packing facility for other certified organic growers. The traceable grocery item selected for this Case Study is a 1 kg punnet of Certified Organic Royal Gala apples

www.randrsmith.com.au

SRT logistics

Headquartered in Brighton Tasmania, operates refrigerated transport and dry grocery logistics servicing wholesale and retail food industries. SRT is a family owned and operated, providing a complete suite of freight services throughout Tasmania and Victoria including shipping across Bass Strait.

www.srtlogistics.com.au

iTrazo®

Offices in Melbourne VIC, Toowoomba QLD and London UK. iTrazo is an Australian owned and operated software company that crafts and engineers "cradle to grave" track and trace software for traceability and data solutions to assist in the optimization and digitization of supply chains. The company has developed a highly scalable traceability platform (iTrazo ADI) that is industry agnostic and offers bespoke solution development to address other supply chain challenges.

www.itrazotracetech.com

Woolworths Group

Our traceability team is dedicated to creating traceability with suppliers and to enabling end consumer information for Macro branded certified organic produce.

www.woolworthsgroup.com.au

GS1 Australia

A member-based not for profit organisation that provides data standards for supply chains. In this industry demonstration, GS1 Australia provided advice on the use of global data standards.

www.gs1au.org

DEAKIN UNIVERSITY

Our researchers provided project management of the industry demonstration through the Implementing Food Traceability Program, an industry-sponsored program to support Agrifood supply chain traceability.

www.foodtraceability.deakin.edu.au

In 2018, Deakin University formed the Deakin Food Traceability Lab, led by a group of thought leaders from industry, government and academia, to tackle challenges that no one company or agency can address alone.

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The Food Traceability Lab drives a research and industry knowledge sharing program called Implementing Food Traceability.

In 2021, the Food Traceability Lab launched the first *Australian Guide to Implementing Food Traceability*, a generic guide for all Agrifood products. Two further guides have been developed, one for Red Meat and another for Organic Produce.

The Guides are designed to support businesses in a supply chain to achieve end-to-end traceability, improving the speed and responsiveness of industry to the growing demand for proof of the conditions of production and journey of the product to the end consumer.

Australian food supply chains and products are of high quality and traceability is a high priority for Agrifood businesses. However, supply chain level traceability, where a "line of sight" can be gained, generally means extracting information from each business, which can be time-consuming and limited by multiple enterprise systems that lack interoperability.

The Guides provide a data framework that can be used regardless of the systems available, to create end-to-end traceability.

AGIFT Industry Case Study for Organic Produce

The purpose of the industry demonstration

The industry demonstration was undertaken to test the *AGIFT*: **Organic Produce** in real industry conditions, to assess the challenges and impact of implementing supply chain traceability. Specific research questions were as follows:

- What burden/additional effort is required by the businesses in this supply chain to collect and share traceability information?
- What were the challenges experienced by the supply chain businesses in implementation?
- Are there persistent "black holes" in the supply chain and how might they be addressed in the implementation program?
- Has the use of data standards supported interoperability between partner systems?
- What technologies were applied in the demonstration and what was their purpose and performance?
- Has traceability supported compliance activities?

What benefits can be gained from application of the AGIFT Organic Produce for supply chain partners and consumers?

Future steps in implementation? Partner priorities and collaboration?

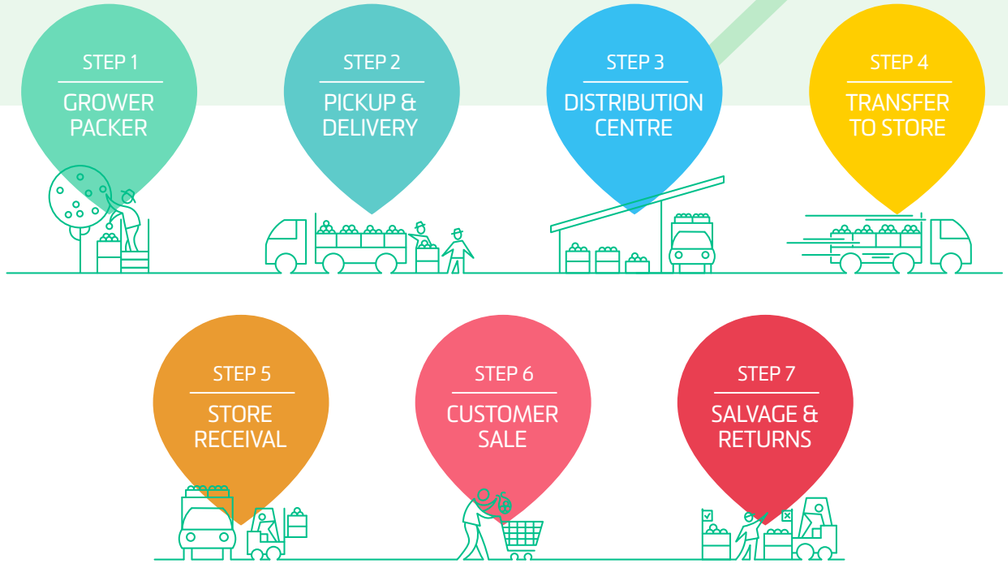
This case study records the demonstration of implementation of traceability involving a SME grower and packer of organic apples. The company certified as an organic operator 20 years ago and is one of 60 organic apple growers across Australia.

Tasks

Formation of the project team

- Mapping the supply chain events and processes for the product
- Creating a data repositary platform supplied by a solution provider partner
- Verifying of key data elements
- Testing the ability to capture and share the data in format for interoperability
- Conduct of traceability test on a specific store order
- Assessment and reporting of results.

The product supply chain



Receival of produce

has several orchards that supply Royal Gala, Pink Lady and Fuji apples. In addition to its own orchards at Grove in the Huon Valley in Tasmania, R&R Smith operates a packing and storage facility which receives certified organic produce from other local orchardists. Being able to identify specific orchards is an important means for growers to assess productivity of individual orchards, to link harvest data and to establish the origin of each bin of apples picked and delivered to the packing facility. In the instance of a pest or contamination incident, a specific site can be quickly identified and quarantined for a targeted response.

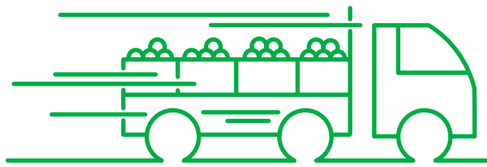
Post-harvest handling

Apples may be stored for several months in controlled atmospheric conditions after inspection or may be graded, sorted and packed onto the punnets, wrapped and date stamped, then into crates carrying 36x 1 kg punnets, each crate loaded on pallets for dispatch, or sent for juicing to another plant.

Packing and dispatch

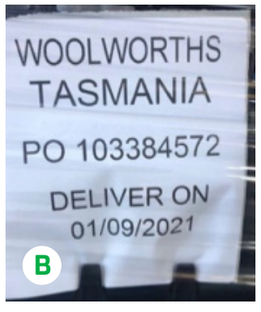
Orders are activated by receival of a purchase order from the retailer. The R&R Smith Warehouse Management System (PackManager) generates a packing list for the customer order. Each crate is labelled with a global trade item number specific to the apple variety and a best before date based on the receival date from the growers. Each loaded pallet is labelled with a serialised shipping container code (SSCC). A transport master label is placed on the pallet with transport instructions once it is allocated to a customer order.

R&R Smith would normally lose visibility of the product once it is received at the distribution centre.

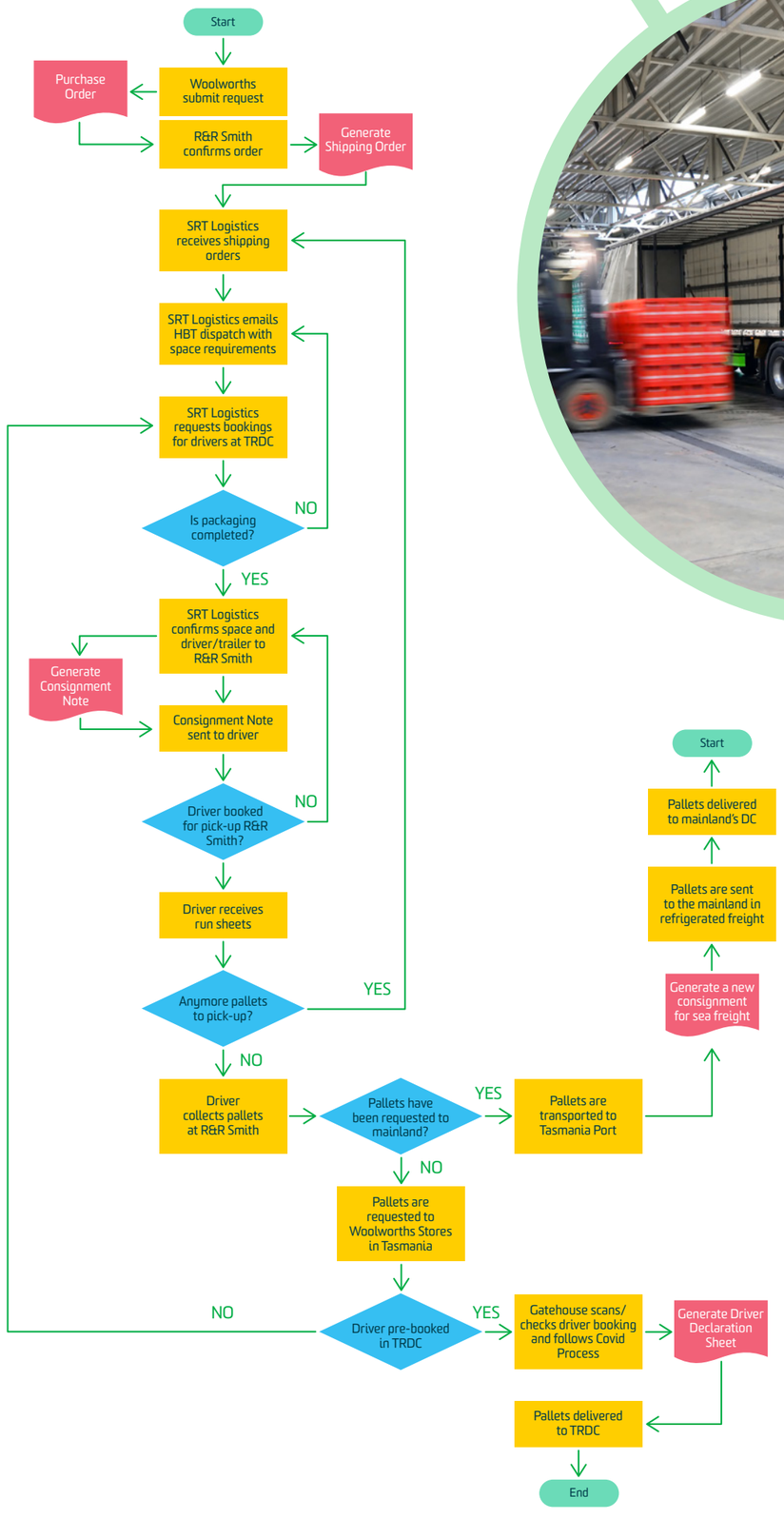


Freight transport

From the packing facility, the pickup by the freight transport operator, SRT Logistics, is organised using a Shipping Order. The process is described as follows.



A. Pallet Label B. Transport Instructions
C. Crate Label



The second leg of freight transport is the transfer of the organic apples from the Tasmanian Regional Distribution Centre out to stores in the State. The TRDC is located near Launceston and has storage facilities for fresh produce. It services Woolworths and independent grocers in Tasmania, handling goods incoming from the mainland as well as produced in Tasmania. The apples are distributed from this storage and sortation facility based on store orders received in the Woolworths system from across Tasmania. Consignments are put together for stores and transport is ordered via the Primary Connect system, enabling pickup and delivery timeslots to be booked by the transport company. Crates and pallets are identified by the serialised container shipping code for these orders. This code is essentially the identifier for the product from dispatch to receival at the supermarket.

Receival and sale at store

The crates or pallets containing the punnets of organic apples are scanned at receival and placed in the certified organic sales area for shoppers in store. Point of Sale data will record the quantity, sale date, global trade item number (GTIN), the supplier and batch, all encoded in the item barcode.

Tracing demonstration

The implementation of traceability went “live” in November 2021. Due to COVID constraints, the supply chain for this demonstration was limited to Tasmania. It consisted of undertaking a trace of a punnet of apples received at store, covering the Critical Tracking Events and Key Data Elements agreed by the project team (see Appendix A) from the supermarket back to the organic grower/packer.

Traceability data

24 tracking events were identified in this supply chain for the demonstration, as a foundation for traceability implementation. The associated Key Data Elements (KDEs) were then verified, and the format of the data recorded. Interoperability was provided via the iTRAZO platform, which was able to receive multiple data formats and enable supply chain partners to access the shared data. This ability was critical, as a significant number of data fields were not digitised or were embedded within an enterprise system requiring extraction prior to sharing. Data was sourced from company records, sensors, and enterprise system capture.

At the completion of the demonstration, all 24 tracking events and their key data elements had been verified: that is data made available to the platform in formats consistent with the data standards as supplied by GS1 Australia.

By logging on to the permissioned platform, participating companies were able to view the CTEs and KDEs for the shipment.

Technologies used

iTrazo ADI Traceability Platform

The iTrazo ADI Traceability platform offers complete “cradle to grave” traceability solutions for products, assets and services supporting all industries. iTrazo ADI traceability platform aggregates key data elements and critical trace events from all supply chain eco-system partners to provide real time data insights on the what, where, when, who, why and how for complete supply chain transparency.

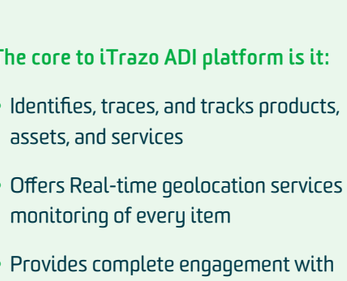
The iTrazo ADI Platform tracks every step in the life of a product, asset, or service by aggregating, capturing, monitoring, analysing and linking key data elements and trace events, from all relevant supply chain eco-system partners to make the entire supply chain tamper-proof, transparent and trusted.

iTrazo ADI platform utilises EPCIS standards for data capture such as the who, what, where, why, when and how to track billions of unique items and events.

The core to iTrazo ADI platform is it:

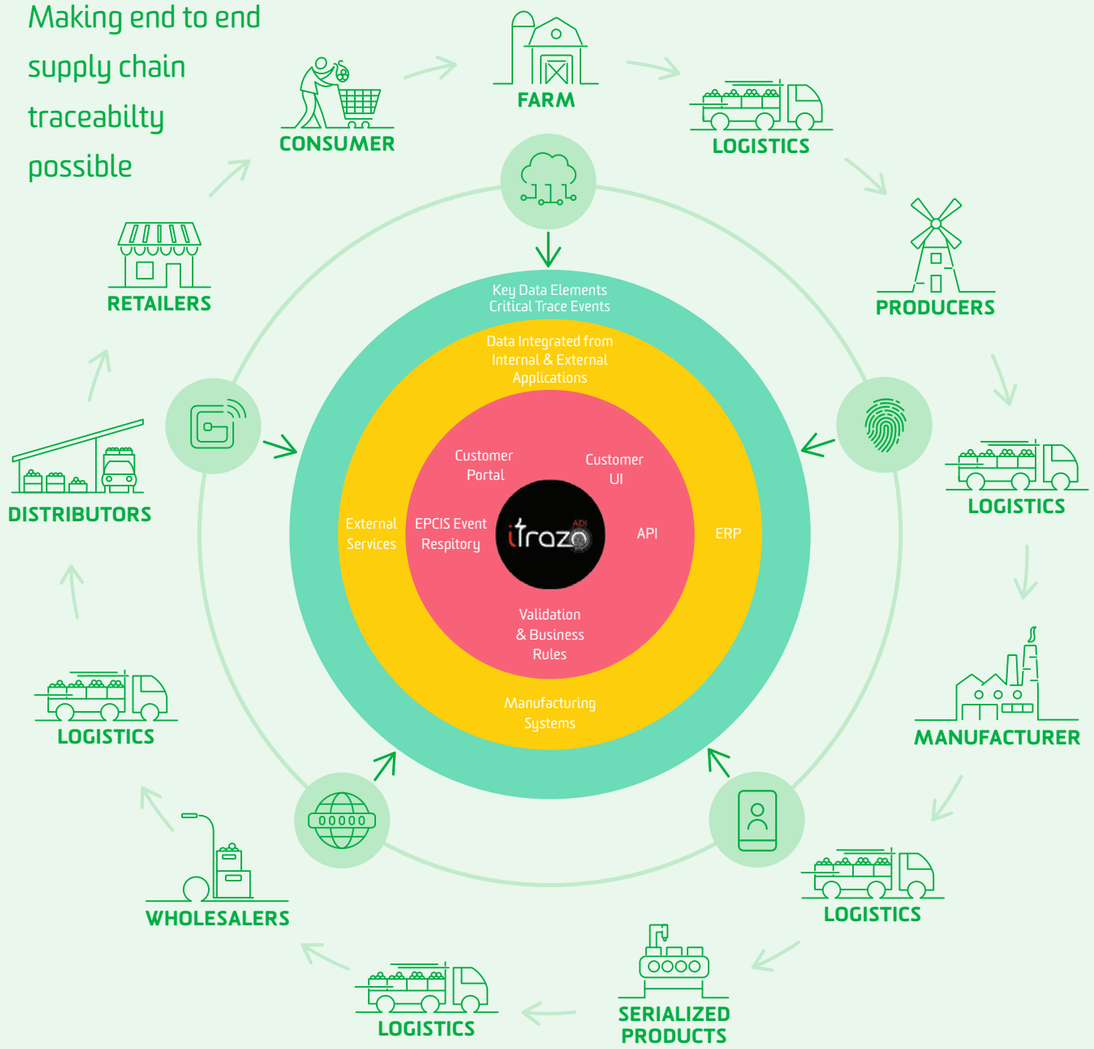
- Identifies, traces, and tracks products, assets, and services
- Offers Real-time geolocation services for easy monitoring of every item
- Provides complete engagement with consumers at the point of purchase and consumption
- Integrators can utilise the highly scalable repository and software as is or adapt it according to unique needs - business, regulatory and process related
- Provides the capability and empowers brand owners to view one aggregated picture of the supply chain or network of supply chains - both downstream and upstream in one platform.

iTrazo ADI makes data collection, mining, sharing and management across a multitude of events, distribution points and outlets easy. It is a highly scalable, modular, EPCIS based solution which supports and empowers the digital supply chain.

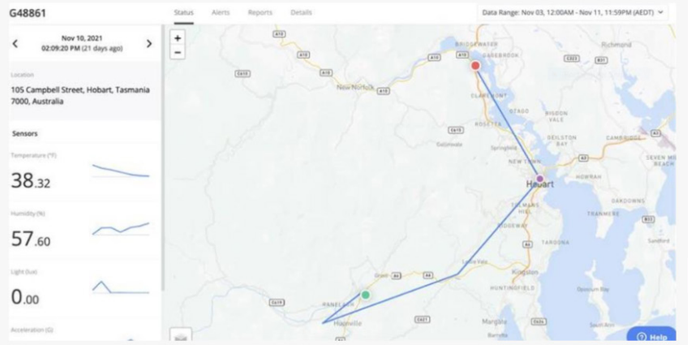


iTrazo

Making end to end supply chain traceabilty possible



Additionally for the Pilot an IoT sensor was utilised in the SRT freight transport leg as a means of monitoring location and temperature data from the pallet. TIVE IoT sensor was made available by iTrazo for industry demonstration and the data was displayed through iTrazo’s Asset Tracking Module.



Findings

Batch level traceability in supply chain

The source orchard of every organic apple received at R&R Smith can be traced via a bin and harvest record. Linking this data with proofs of certified organic status and the organic management and handling plans, recording inputs and analytical testing conducted annually, gives a high level of assurance to Australian consumers, verifying the label they currently see on the product.

In this demonstration of traceability for a certified organic produce, the grower, packer, freight transport operator and retailer were able to use the CTEs and KDEs that enable a consumer to learn the product organic status is protected in the supply chain and can be traced to the grower.

The consumer engagement and feedback data was not captured. The last event captured as part of the Pilot was the point-of-sale data.

It is recommended that as the industry demonstration is extended to production rollout a QR is implemented on the punnets for consumer feedback and engagement to build organic claims trust with the consumers.

Individual company effort to achieve traceability

Mapping of the product supply chain was conducted with the support of the solution provider. The initial task for each company was to locate the agreed CTEs and KDEs within their business systems. Few gaps were identified in available data, however the extraction of the key data elements from enterprise systems to share to the traceability platform was largely manual.

Key to the success of this demonstration was the use of the traceability platform, which can receive data in disparate formats from each enterprise, verify the data and structure it in standardised format in a dashboard model. The use of application programming interfaces (API) to enable each enterprise to share data "as is" from their systems and business records avoids the high cost of system integration between individual businesses. In this case, the platform functions as intermediary between each business. A benefit of this approach is that it reduces cybersecurity- related risk of shared enterprise data, with security standards applied by the platform operator.

The cost to implement traceability

The cost to implement traceability within a producer's supply chain may vary from one producer to another. Traceability can be implemented for different purposes such as:

1. Complete end-to-end supply chain traceability - to manage operational and supply chain challenges such as compliance, product recall, counterfeiting, product diversion, ethical sourcing, provenance etc.
2. Consumer Engagement - to build direct brand trust and gain consumer feedback on product quality and concerns.
3. Asset tracking to monitor asset utilisation, spoilage, recalls.

Each of the above steps provides data insights to the producer that they may previously not have had access to hence providing an immediate return on their investment to enable real-time business decision making.

The initial cost to implement traceability includes one-off costs for project implementation which includes scoping, mapping "as is" to "to be" business processes as well as integration with various supply chain eco-system partner applications and hardware to source key data elements and critical trace events. The ongoing costs would be use of the traceability platform along with support and maintenance.

To utilise GS1 global data standards for supply chain identifiers, the following costs items will apply

- Annual GS1 Membership fee (based on company turnover)
- Printer hardware and software costs (2 printers, one for individual barcodes and trays, one for pallet labels)
- Label stock for punnets, trays and pallets
- Pallet label configuration (transport mods)
- Printer maintenance/servicing fees
- Additional GLNs issued.

Manual record-keeping

R&R Smith is progressing digitisation of record keeping in relation to orchard operations. The Company has also invested in post-harvest equipment for sorting, cleaning, grading, storage and packing operations. For supply chain, the company relies on the Woolworths supplier systems to create linking records from the ordering and distribution processes.

SRT Logistics is developing new enterprise tools which will transition a number of manual recording processes to digital records, relieving the reliance on the driver's manual record-keeping in the pickup and delivery operation. The company also relies on Woolworths Primary Connect system to create supply chain level data connectivity.

The information that end consumers are seeking will place greater pressure on growers, packing and transport operators to provide proofs that the production and handling of certified organic produce is consistent with international and national standards and to underpin the premium value of these products.

Transitioning to digital record-keeping will create formats for key data elements that will allow these proofs to be available to consumer-facing businesses, such as foodservice, and in this case, supermarkets. This data can be translated into user-friendly formats, and it can also drive consumers to the grower or packer website, where a range of information about the product and digital assets can be accessed.

Of the 24 tracking events, 7 are wholly reliant on manual record-keeping. Others depend on Key Data Elements derived from enterprise records that are held in Excel spreadsheets, entered manually, and extracted specifically for the purpose of sharing to the traceability platform.

The burden of manual entry and extraction of data can be replaced by automated data transfers, averting human error and company staff time.

The issue for smaller companies in a supply chain relates to the drivers of automation and digitisation of systems. If the customer or regulator does not require the data via a supply contract specification, or as a mandated compliance activity, individual businesses must choose between these supply chain interface investments and internal priorities such as production or process improvements that have a direct benefit to the company. Without the leadership and support of major partners or government the dilemma remains a challenge.

Creating the data structure for traceability of organic products

Currently the Australian Minister for Agriculture is considering the regulation of organic products in the domestic market. While exported organic products require certification by authorised certifying bodies approved by the Department of Agriculture Water & the Environment, there is no requirement for organic goods to be certified to underpin their claims.

Those companies that are certified organic, as is the case for R&R Smith, undergo rigorous audit and should expect a premium, given the effort required to meet the standards.

The certified product must be distinguishable and traceable for the consumer and demonstrable by the grower, packer, handler and retailer.

Having a data framework that enables growers, handlers and retailers to demonstrate their organic status, compliance with organic product standards, combined with the ability to trace and verify the product, will distinguish the certified product from non-certified products in the market.

Integration of supply chain level traceability into the "Certified Organic" standards using the AGIFT: Organic Produce would enable traceability to integrate at the enterprise audit and for greater standardisation of data formats, alleviating the need for businesses and solution providers to continually re-invent data structures and determine what data is required.

Use of supply chain data standards

GS1 global data standards provided unique identification of business entities, locations, events and products in the supply chain. This "system" of codes are formatted for use across custody interfaces. In the industry demonstration, the iTRAZO platform used GS1 standards to support data sharing.

Electronic product code information services (EPCIS) data standards are used to record the who, what, where, when and why of the journey of the product.

Creation of shared value

SMEs seek to derive return on investment and brand value from investment. They carry significant assets to produce the product and provide the freight transport and storage services.

Traceability at a supply chain level requires the businesses to delivery shared value. This may not be captured immediately in the individual business, making it difficult to locate return on investment. For example, the consumer may utilise a QR code or NFC tag to access more information about how the grower operates the orchards to produce organically certified fruit. This may increase consumer loyalty, which in turn can influence product demand. This must first be instigated through the packaging and POS system of the retailer.

The following Figure describes the elements of creating shared value between the businesses in a supply chain. Research conducted by MIT indicates that new value propositions are likely to be found by adopting this approach to shared value.

The iTrazo platform aggregated the data from all the R&R Smith eco-system partners to provide near real-time data insights of the supply chain events.

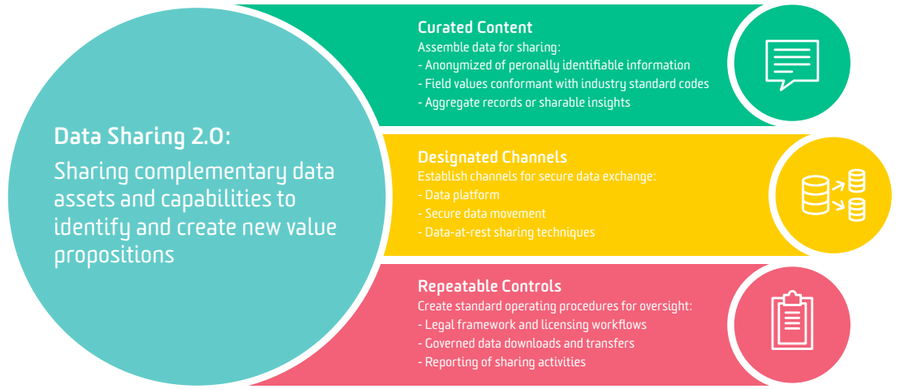


Figure 1: Data sharing 2.0 accelerators and activities *Source: MIT 2020*

Next steps

This industry demonstration shows the ability of SMEs to participate in supply chain level traceability despite the limitations of their enterprise systems. The next step for the businesses in this supply chain will be to prepare a business case which clearly shows the benefits and costs for each participant, the framework for governing data sharing and the mechanism/ platform to be used.

Each business is starting from its own level of digitisation, existing enterprise systems and business priorities. A shared strategy can now integrate CTEs and KDEs for certified organic standards into the supply chain traceability implementation.

Support is needed for the small companies to participate and assess their options in terms of technologies, understand the value for their business and work through their individual pathway to digitise business processes.

The companies have had working relationships for some time. Importantly, traceability to support certified organic status enhances collaboration within this supply chain.

Appendix A

Critical tracking events and key data elements

Critical Tracking Events	Key Data Elements
Organic Production	
Property Identification	Property Identification Code (PIC) Global Location Number (GLN) Geocode data – standalone or incorporated into Global Location Number
Organic status and provenance verification	Organic status of land Organic certification number Audit completion date Provenance verification/analytical testing document code
Registration of premises	Business Licence Number issued by state agencies Global Location Number (GLN) of premises and facilities Geocode data – standalone or incorporated into Global Location Number
Organic Management Plan/Organic Farm Plan	Organic Farm Plan unique document code Date of preparation
Harvest	Harvest date Product ID, Batch, Quantity, location
Product inspected, graded, weighed and counted	Product ID, Batch, quantity (weight and count)
Product cleaning	Wash, inspection date, location
Product pack and label	Date packed Best before date Licence premises number/approved arrangement number for export Producer name and address Organic certification number and certifying body Lot number, item code and pallet ID Product QR code/digital barcode for consumer information Link to farm business website/ test certificates/ provenance verification
Product storage location	On-farm storage site location ID Time and date stamp on product arrival/dispatch at storage Outbound shipment date and time stamp Product ID – tag number; lot number Product Variety Product Quantity received e.g. weight, units
Product received	
Product monitoring in storage	
Waste and by-product removal	Off-farm disposal carrier ID; waste facility receival ID; time and date of product leaving the farm; time and date of product received at waste facility;

Critical Tracking Events	Key Data Elements
Organic Production	
Prepare shipping documentation	Consignment Note number; Inspection certificate number for the consignment; Plant Health Declaration Number; Commodity Vendor Declaration number
Product Dispatch	SSCC transport labels scanned; Gate out timestamp; Vehicle registration

Standards for transport and storage of certified organic produce (ACOS 2021)

8.4.1 Transport and storage operators may be certified under the provisions of wholesaler in this Standard as well as the criteria outlined below.

8.4.2 Inspection of facilities not certified under this Standard, but utilised by certified operators, may be randomly assessed by auditors assigned by the CB. Prior to initial use, an inspection of facilities shall be undertaken by an assigned auditor of the CB. Such assessment shall include conformance with the following outlined below:

8.4.3 Documentation outlining certified status of product/s shall be maintained by the transport or storage operator. This shall include ensuring that effective signage and/or labelling is present with certified materials to ensure prevention of mixing of certified products with non-certified products.

8.4.4 Storage of certified products with conventional products shall be restricted as a practice and only occur where no contamination potential is posed to certified products.

8.4.5 In cases of storage and treatment of products (e.g., gassing of bananas) treatment shall not take place in conditions that may pose contamination risk to certified products.

8.4.6 Barriers and/or packaging shall be utilised to ensure that no cross-contamination may occur to certified product in transit or storage.

8.4.7 In the case of bulk carrying or storage of certified product, or in other instances where certified materials may come in contact with surfaces that may have been exposed to contaminating products prior to use, full clean-down protocols shall be documented, enacted and recorded prior to handling of certified materials.

8.4.8 In instances of potential contamination, monitoring shall be in place to verify that no contamination has occurred to certified product.

8.4.9 Prohibited fumigants and other treatments utilised by the operator shall not be used when certified materials are present, nor used in a way that may in the future pose risk of contamination to certified materials.

8.4.10 Where prohibited materials are utilised within transport or storage areas as a last resort to control pests, such products shall require prior approval by the CB, and may include a requirement for residue monitoring to verify no contamination of certified products.

8.4.11 Permitted storage and treatment techniques include the following:

- Controlled atmosphere
- Cooling
- Freezing
- Drying
- Humidity regulation
- Ethylene gas is permitted for ripening of bananas and tropical fruits, and de-greening of citrus.

Freight Transport Organics	
Establish identities and locations for consignor and consignee	Global Location Number - Transport Company; Consignor; Consignee
Transport Company licences, permits and registrations	Food Transport Business Licence number and currency
Consignor receives transport booking confirmation	Booking Reference Number
Consignor prepares transport documentation - Consignment Note, CVD e.g. grape vines; nursery stock	ASN number
Affix Transport Labels	SSCC on pallet
Send Advance Shipping Notice to Consignee	ASN number
Pickup - gate in and gate out	Date and time of dispatch; Vehicle registration number
In-transit monitoring	GPS location tracking; transport status message
Delivery	Gate in date and timestamp SSCC of inbound product signed POD Number SSCC of cartons or pallets of missing or damaged stock Gate out date and timestamp
Carriage of salvage/returns (if contracted)	SSCC of salvage/return stock
Returnable transport Asset Management e.g.pallets	SSCC allocated; SSCC at load and unload
Store Delivery	Pallet SSCC; Store ID; Product ID/SKU; Batch/Lot number; Quantity; Consignment Note ID; Delivery date; Best Before

Transport requirements for Certified Organic product	
Labelling of product as certified organic on transport labels	
Prevention of contamination, co-mingling, substitution of certified organic produce. Maintain the identity, traceability and organic integrity of the product	Bulk product separation in transport
	Physical barriers, devices, treatments to avert co-mingling in transport containers
	Pest control measures in transport depots compliant to organic standard
	Transport assets and equipment cleansing & sanitation as permitted under the organic produce standard
Audit for traceability	Inbound produce source Identification of produce Outbound produce destination Record of supplier inputs and usage
Access for certified organic auditors	Access for authorised AWE certified organic bodies for inspection

Distribution and Retail	
Retailer DC receival	Supplier GLN; POD number; Lot Number; BB/Expiry date; Returned Stock inventory report
Putaway (may not be necessary with fresh produce)	Pallet SSCC; Product ID/SKU; Batch/Lot number; Quantity
Pick for store delivery	Pallet SSCC; Product ID/SKU; Batch/Lot number; Quantity
Store Delivery	Pallet SSCC; Store ID; Product ID/SKU; Batch/Lot number; Quantity; Consignment Note ID; Delivery date; Best Before
Store Receipt	Delivery Note number; Consignment Note number; Store Order Number; Pallet SSCC; Date received
Point of Sale (POS)	Product ID, quantity; batch number; best before date; store ID
Returns and salvage	Product ID; Supplier ID; Quantity; batch/lot number; Store ID; reason for return

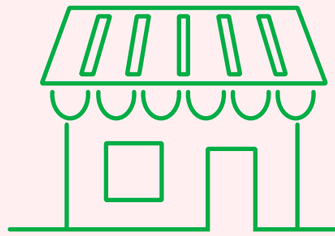
Organic Standards related to retail chains

8.1.9 Whole retail chains, multistore outlets or selected retail outlets within a retail chain or group may be certified under this Standard where there is single ownership and full management control exercised by one single commercial entity.

8.1.10 Retail chains or multistore retail outlets require an umbrella management structure that are to be included in annual audits arranged by the CB. Annual audits will include a review of all internal audits conducted on retail outlets to verify the effectiveness of the umbrella management structure.

8.1.11 Annual audits by the CB shall include inspection of at least 20% of all participating retail outlets connected to the chain with all outlets being inspected over a five-year period. Umbrella management control shall include regular internal audits of each outlet, which are documented, recorded and made available to the CB on request. Such internal audits should occur within each twelve-month period and all internal audits shall be assessed by the CB via third-party audits for conformance to this Standard.

8.1.12 Documented procedures shall be maintained by the umbrella management group for monitoring of stores and certified products via internal audits, procedures for individual store non-compliance, and sanctions imposed on non-complying stores and/or products.



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