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Effective Fresh Produce Traceability Systems

Sustainable Farming Fund Project: 404582

Milestone 1 Learnings – Literature Review

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Literature Review Methodology

- Peer-reviewed, desk-based approach
- Prepared by: Jacob Lawes BNatSci, Melanie Trotman MSc, Dr Hans Maurer, The AgriChain Centre Ltd.
- Both domestic and international literature reviewed
- Timeframe: July – August 2018
- Represents Milestone 1 in 12 Milestone project
- Published September 2018
- Available for download at: https://www.unitedfresh.co.nz/assets/ssf-library/United-Fresh---SFF---Literature-Review---September-2018.pdf

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Findings – Common Themes In The Literature

A. A common data infrastructure is needed in order for external Traceability to work in an unimpeded way.

B. Attempts to achieve industry-wide Traceability initiatives fail when industry participants are solely focused on their internal needs, without appreciating the relationship between the industry as a whole and its' customers and consumers.

C. Supply chains are becoming more complex, and the advances in new technologies will require paradigm shifts, the emergence of Blockchain technology in recent years being the prime example.

D. Traceability requires an organised and structured approach to business management as well as commitment from business owners, boards and Chief Executives.

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The Need for Traceability – A Timely Reminder

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A. Common Data Infrastructure – Key References

1. Bosona, T., & Gebresenbet, G. (2013). Food Traceability as an integral part of logistics management in food and agricultural supply chains. Food Control V.33 p32-48.

2. Staff (2014). Dairy Traceability Working Group Report A – Proposed Regulatory Requirements for Traceability. Dairy Traceability Working Group.

3. Staff (2015). Traceability in Food and Agricultural Products. International Trade Centre.

Ngee Ann City, Singapore. Maurer, 2018

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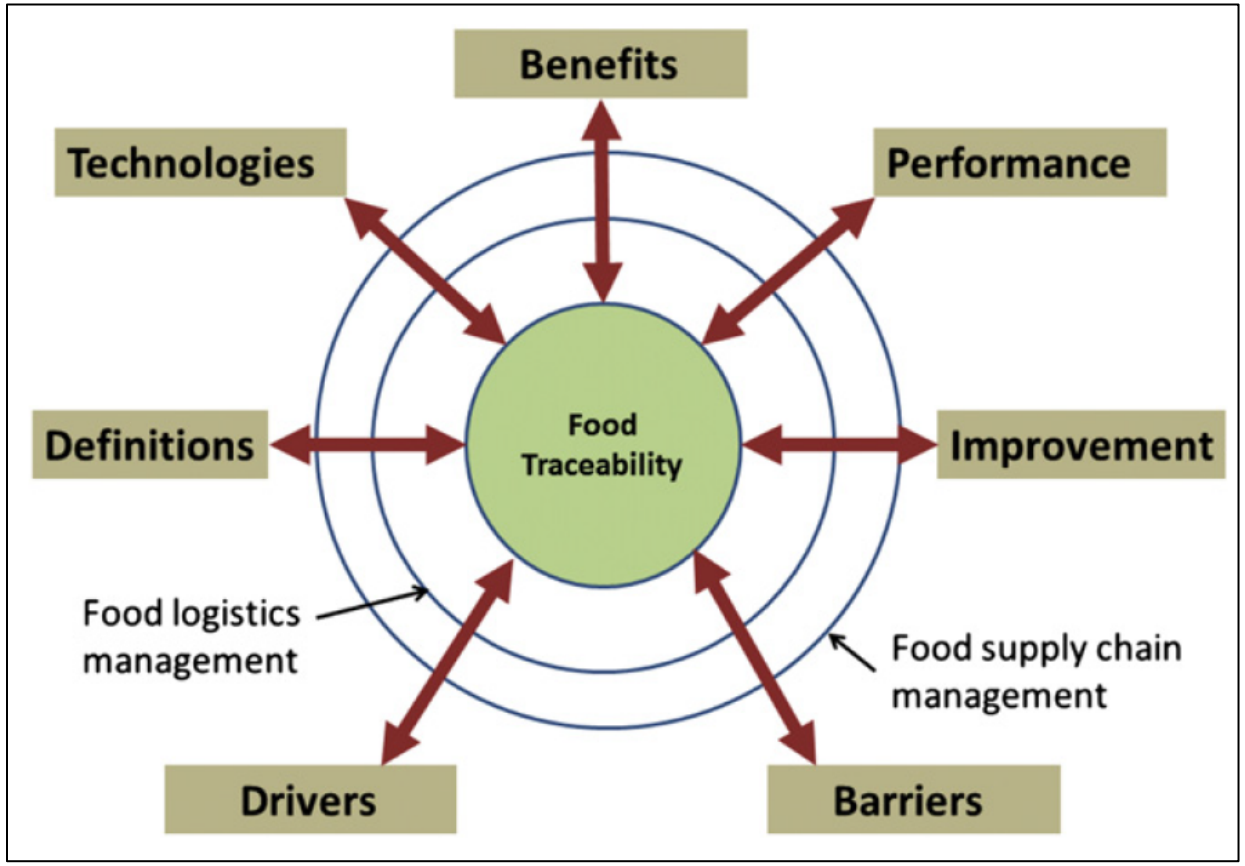
A. Common Data Infrastructure

Bosona, T., & Gebresenbet, G. (2013).

- "Food Traceability is part of logistics management, which captures, stores, and transmits adequate information about a food, feed, food producing animal or substance at all stages of the food supply chain, so that the product can be checked for safety and quality control, traced upward, and tracked downward at any time required".

- 'In the case of small farmers, an efficient paper based system enables effective tracing of product without the need for introducing expensive and complicated traceability systems at farm level'. (*paraphrased*)

- "In long food supply chains, implementation of effective traceability system need integration of the different parts of the supply chains. Implementing traceability systems that fully cover the entire supply chain leads to the highest benefit, rather than focusing on partial improvement of traceability".



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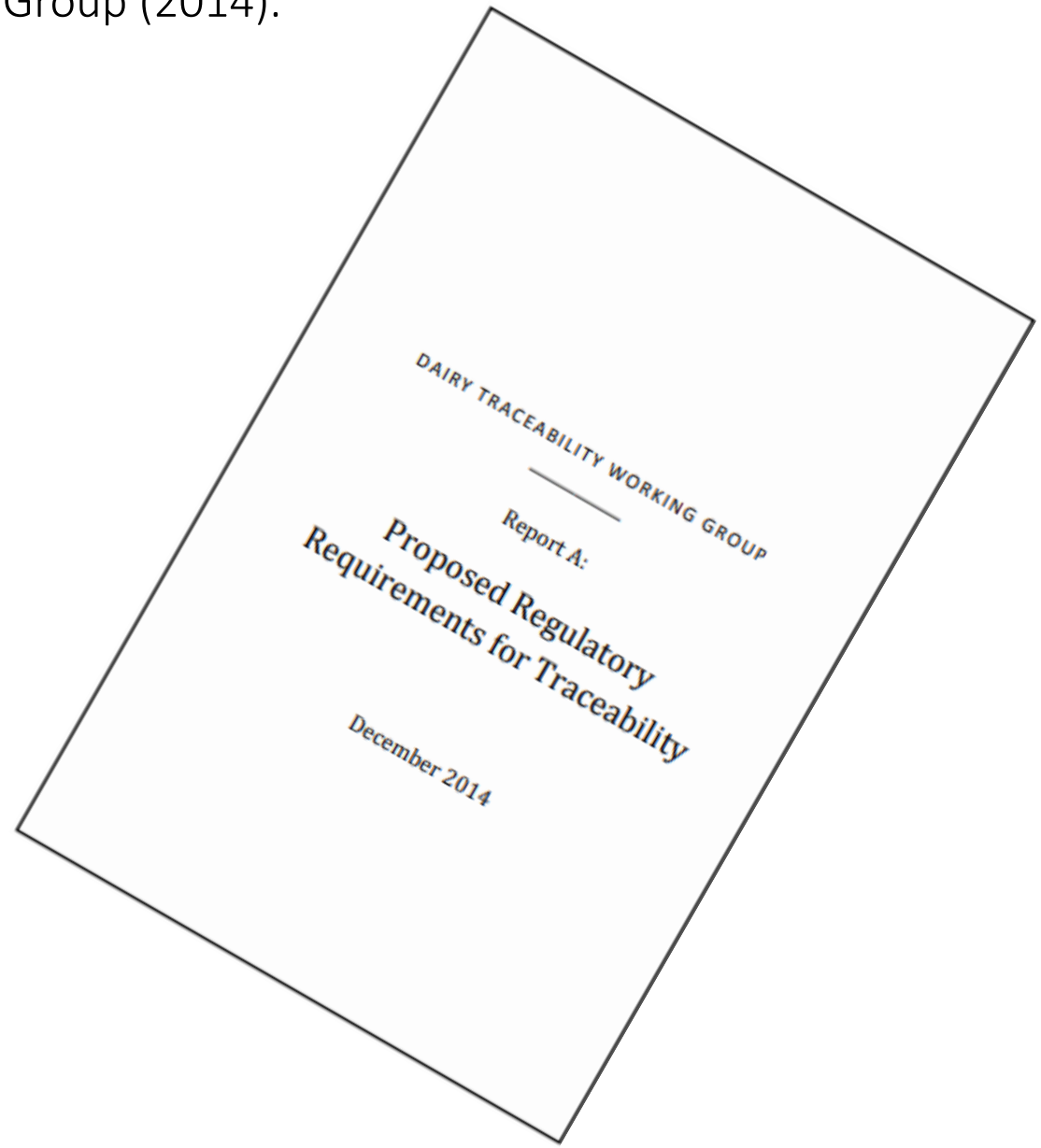
A. Common Data Infrastructure

Dairy Traceability Working Group (2014).

- "Given the importance of Traceability in managing food safety, the recommendations of the working group will be considered for all food sectors, not just dairy".

- "Provision for full chain Traceability from farm-gate to consumer, through an inter-operable 'one-up, one-down' system".

- "New Zealand Government agencies and industry to develop and implement a strategic action plan to encourage within APEC and other international forums, the introduction of agreed global standards and inter-operable Traceability processes in all aspects of international trade in food and food products".


DAIRY TRACEABILITY WORKING GROUP

Report A:

Proposed Regulatory Requirements for Traceability

December 2014

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A. Common Data Infrastructure

International Trade Centre (2015).

- "Traceability systems applied correctly, with supporting information and communications technologies, enables businesses to monitor and defend against risk in real time".

- "Businesses are able to make more informed decisions, leading to increased market penetration, and reduced operating costs".

- "In practice, Traceability systems are record keeping systems that show the path of a particular product from suppliers through intermediate steps, to consumers".

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B. External Traceability – Key References

1. Staff (2002). Canadian Produce Marketing Association / Produce Marketing Association (United States) Traceability Task Force – Traceability Best Practices – Fresh Produce Industry (North America). CPMA/PMA.

2. Vaché, D. (2010). Produce Traceability – Needs and Solutions. PowerPoint. United Fresh Produce Association of America.

3. GS1 Global (2015): Traceability for Fresh Fruits and Vegetables Implementation Guide.

Hertogenbosch, Netherlands. Maurer, 2018

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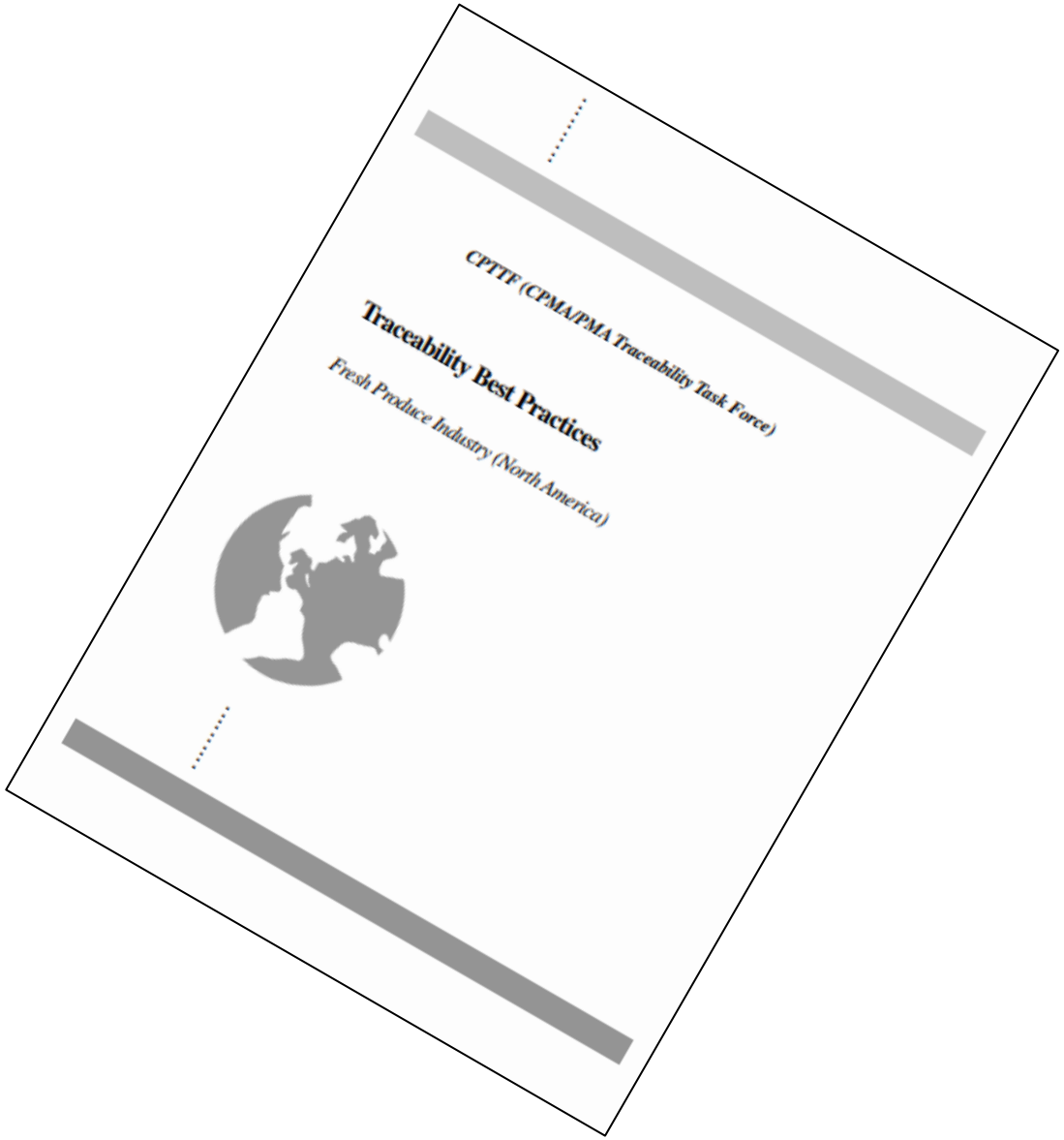
B. External Traceability

CPMA/PMA (2002).

- "Incompatible codes severely restrict the industry in moving forward with various technology initiatives and hampers an effective traceability process".

- "As a prerequisite for external traceability, companies must have systems in place that adhere to industry standards for data attributes, data exchange and business processes (as outlined in the remainder of this paper)".

- "Retailers and suppliers have proprietary systems specifically designed to accommodate fresh produce".


CPTTF (CPMA/PMA Traceability Task Force)

Traceability Best Practices

Fresh Produce Industry (North America)

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B. External Traceability

Vache, D. (2010).

- "Create a framework for total produce supply chain traceability that can be embraced and implemented by industry:
  - Incorporate the use of common standards
  - Drive consistency across the industry
  - Agree on an action plan and timeline
  - Provide motivation, education and support for industry adoption"

- "Committee Recommendations
  Adopt GS1 standards – all companies (External vs. Internal Traceability)
  Brand owners assign 14 digit GTINs *(Global Trade Item Number)* to all case configurations
  Packers (re-packers) print GTINs, lot number, pack/harvest date on all cases (Both GS1-128 barcode and human readable)
  All GTIN data must be captured and stored through outbound to final store"

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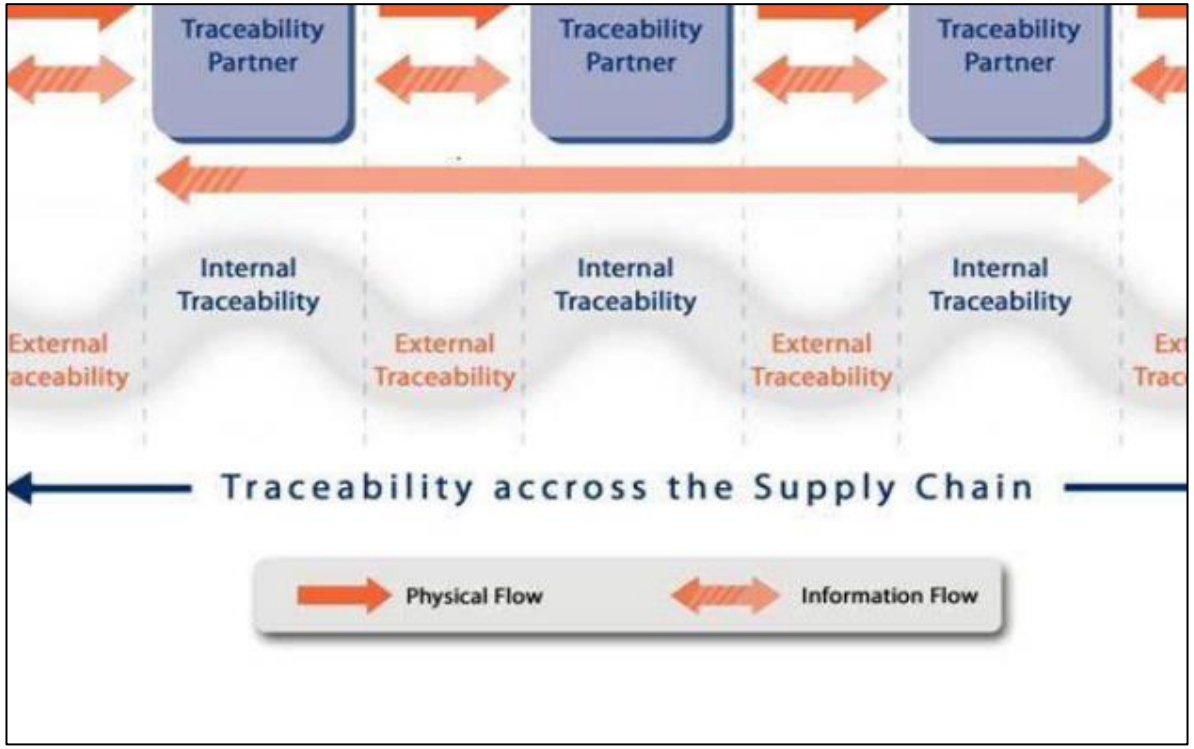
B. External Traceability

GS1 Global (2015).

- "Traceability is a business process that enables trading partners to follow products as they move from field through to retail store or food service operator. Each Traceability Partner must be able to identify the direct source (supplier) and direct recipient (customer) of product".

- "The first priority of traceability is to protect the consumer through faster and more precise identification of implicated product".

- "The best practices recommended are based on GS1 global standards for supply chain management and product identification. These standards were developed by industry to optimize business practices across supply chains world-wide".



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C. Supply Chain Complexity & New Technology – Key References

1. Fruit Logistica Trend Report 2018.

2. Verdouw, C. et al. (2016). Virtualization of food supply chains with the internet of things. Journal of Food Engineering. V.176, p128-136.

3. http://www.fruitnet.com/eurofruit/article/174254/fresh-produce-supply-in-the-digitalage.

Amsterdam, Netherlands. Maurer, 2018

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C. Supply Chain Complexity & New Technology

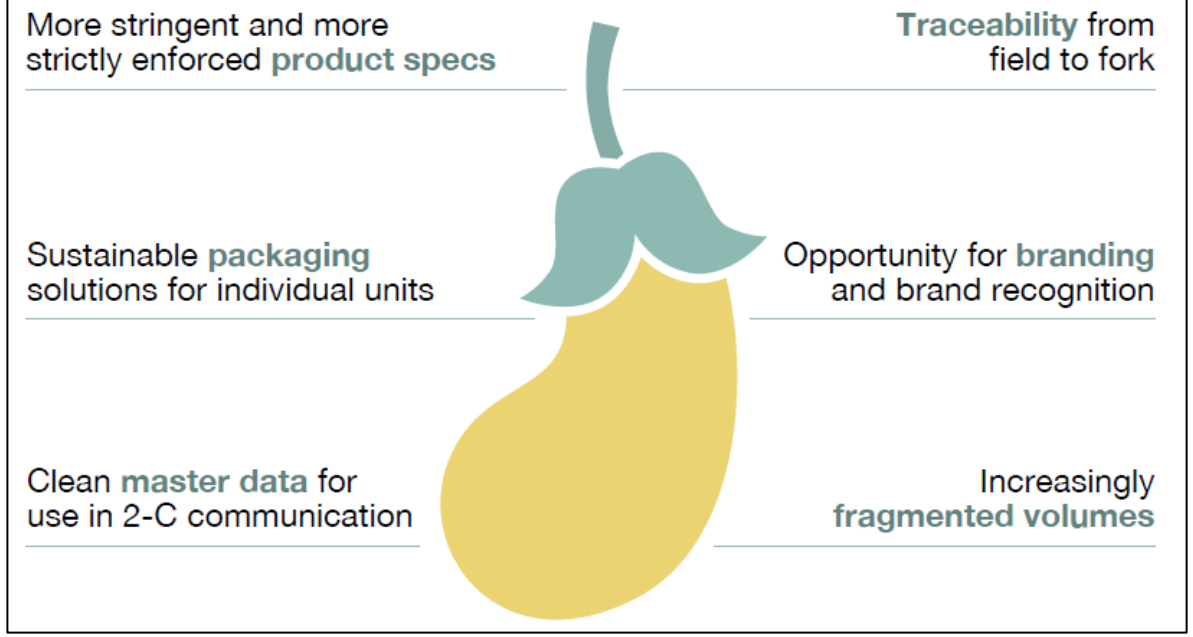
Fruit Logistica Trend Report (2018).

- "The fruit and vegetable supply chain is in continuous flux as it is shaped and re-shaped by emerging markets and consumer demand".
- "Actors right along the supply chain – from growers to retailers – are expanding and consolidating. Their advances coincide with a notable drive towards greater efficiency, a trend that is assisted by seemingly unstoppable technological advance".
- "Traceability back to the individual field is likely to become commoditised (the norm) in due course, and could even end up supported by regulation".

FIGURE 8.

THE NEW MINIMUM STANDARDS CATALYSED BY ONLINE RETAIL

Source: Oliver Wyman



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C. Supply Chain Complexity & New Technology

Verdouw, et al. (2016).

- ‘An increased appearance of future internet applications is expected to change the way food supply chains are operated – and it will be in unprecedented ways’. (*paraphrased*)

- “Virtual supply chain management does not require physical proximity, which implies that the path or route followed by the physical products from source to destination is no longer dependent on the location of the partners executing control and coordination”.

- ‘Virtualization can play a major role in addressing specific challenges of food supply chains, including a high perishability, unpredictable supply variations and stringent food safety and sustainability requirements’. (*paraphrased*)

Berlin, Germany. Maurer, 2016

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C. Supply Chain Complexity & New Technology

Fruitnet / EuroFruit Article (2017).

- "Real-world retailers have been forced to rethink their entire operations, in many cases curtailing investment in areas like new store openings and diverting their resources towards more modern forms of grocery distribution, like click-and-collect, home delivery networks and so-called dark stores whose entire raison d'être is to fulfil orders placed online".

- "New market entrants have seen fit to do away with real-world retail altogether and focus solely on managing logistics networks in order to serve online customers".

- "In a marketplace that is increasingly globalised and interconnected, the way fresh fruit and vegetables are carried from origin to destination is changing, and the expansion of online distribution is at the heart of that change".

"100 reasons to reach 100 years of age"

Lake Constance, Germany. Maurer, 2016

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D. Organised & Structured Approach – Key References

1. Staff (2013). GS1 USA. Integrated Traceability in Fresh Foods: Ripe Opportunity for Real Results.

2. https://www.logisticsbureau.com/7-things-that-matter-most-to-fresh-supply-chain-leaders/.

3. Staff (2014). United States Department of Agriculture (USDA) – Traceability in the U.S. Food Supply: Economic Theory and Industry Studies.

Bugis Village, Singapore. Maurer, 2018

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D. Organised & Structured Approach

GS1 USA (2013).

- "Industry players realize that it is necessary to align [fresh food] supply chain practices with the well-tested and proven processes already established and successfully used by food manufacturing companies within grocery retail channels".

- "The reason the Produce Traceability Initiative decided to use GS1 Standards is that the grocery channel is already heavily invested in these standards for consumer packaged goods".

- "An integrated traceability process also allows for net economic benefits for all supply chain participants, from suppliers to processors, to distributors, to retailers and foodservice companies".

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D. Organised & Structured Approach

Logistics Bureau Article (2016).

- "Fresh supply chain leaders are turning increasingly to initiatives that involve sharing of distribution networks, infrastructure, and even vehicles".

- "Smart companies, whether retailers, wholesalers, or producers, are reviewing their distribution networks for fresh produce, and realigning where necessary to increase velocity and improve responsiveness to variations in supply or demand".

- "Industry leaders are embracing fresh supply chain transformation in order to access benefits such as:
  - Better sales results
  - Less labour investment
  - Cost savings in logistics
  - Improved brand loyalty
  - Reduced risk
  - Increased profits"


7 Things That Matter Most To Fresh Supply Chain Leaders

Oct 24, 2016 | Supply Chain | 2 comments

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D. Organised & Structured Approach

USDA (2014).

- "Firms use traceability systems together with a host of other management, marketing, and safety/quality control tools. Simply knowing where a product is in the supply chain does not improve supply management unless the traceability system is paired with a real-time delivery system or some other inventory-control system."

- "Tracking food by lot in the production process does not improve safety unless the tracking system is linked to an effective safety control system".

- "In the fresh produce industry, the development of traceability systems has been greatly influenced by the characteristics of the product. Perishability of and quality variation in fresh fruits and vegetables necessitate the boxing and identification of quality attributes early in the supply chain, either in the field or packinghouse".

Chicago, United States. Maurer, 2016

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Additional Findings – Traceability Drivers

- Consumer expectations
- Supply chain evolution
- Technology advancements
- Industry globalisation
- System complexity & speed
- System & information fragmentation
- Crop type & packaging style
- Industry structure
- Paradigm shifts in attitude towards fresh fruit & vegetables

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Literature Review:

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