McKinsey & Company, a global management consulting firm, provided expertise and guidance for the development of this white paper.

**It is clear that unique identification of products and the standardized exchange of product data at critical tracking events through the supply chain contribute to food safety.**

**An integrated food traceability approach would build and improve upon existing food tracing protocols.**

# INTEGRATED TRACEABILITY IN FRESH FOODS: RIPE OPPORTUNITY FOR REAL RESULTS

## EXECUTIVE SUMMARY

The fresh foods industry recognizes the importance of traceability and food safety, yet some sectors are further along than others in implementing whole-chain traceability processes. Industry segments and supply chain stakeholders are seeing past their differences and building consensus toward an integrated and unified traceability process that can benefit all fresh food product subcategories—from produce to seafood, from dairy, deli, bakery to meat and poultry, and more.

Industry players realize that it is necessary to align supply chain practices with the well-tested and proven processes already established and successfully used by food manufacturing companies within grocery retail channels. The common denominator in these supply chain practices is the use of GS1 Standards, and GS1 US™ is the catalyst for driving the industry toward an integrated and interoperable food traceability process. In short, the fresh foods industry is ripe with opportunity to reap real business results from the transformational effects of using GS1 Standards as the foundation of traceability and food safety.

## MARKET DRIVERS — FOOD SAFETY LEGISLATION AND CONSUMER DEMAND

The two primary drivers toward improved traceability in the fresh foods industry are legislation, such as the 2011 Food Safety Modernization Act, and an increase in consumer demand for accurate and complete information about the food products they consume, especially fresh foods that are more prone to spoilage, contamination, and potential harm to the public.

## STATE OF THE INDUSTRY FOR WHOLE-CHAIN TRACEABILITY

Faced with the challenges of meeting regulatory requirements and satisfying consumer expectations for safe fresh foods, industry segments are evolving on separate, yet parallel paths to define their own traceability guidelines—and address the supply chain-related aspects of food safety.

Based on the lessons learned during traceability implementations, it is clear that unique identification of products and the standardized exchange of product data at critical tracking events through the supply chain contribute to food safety while also establishing cost-efficient business processes for information linkages to all participants in the supply chain.

## Integrated traceability has the potential to transform the fresh foods supply chain.

### INDUSTRY PARTICIPATION AND BUYER OPERATIONS STUDY

Throughout the fresh foods industry, trading partners generally agree that a standardized framework is needed to minimize the financial impact of food recalls and optimize preparedness in order to address safety concerns.

The Produce Traceability Initiative is the most visible example of a proactive, industry-led effort guiding stakeholders—representing every part of the produce supply chain—toward case-level traceability. This disciplined cross-industry approach has proven to be an effective methodology for driving change and is being recognized by other sectors as the "go-to" process for traceability implementation.

Based on the Buyer Operations Study conducted by GS1 US with meat, seafood, and produce suppliers—along with distributors, retailers, and restaurant operators—findings confirm that improving traceability processes results in enhanced food safety, reduced costs, and incremental increases in revenue generation.

### LEVERAGING GS1 STANDARDS FOR AN INTEGRATED FRESH FOOD TRACEABILITY APPROACH

An effective integrated traceability process needs to be built on a standardized approach to product and location identification while also remaining flexible for the various supply chain roles and responsibilities within the ecosystem. While many trading partners already have linkages to external systems and processes for some level of product traceability, the next step toward an integrated approach is to identify opportunities for interoperability between internal and external processes across the entire food industry.

This approach will require:

- Common language and procedures shared by all fresh food categories through all levels of the supply chain
- Interoperable hardware and software solutions
- Full operational/financial commitment from all supply chain companies in fresh foods
- Clear evidence of benefits for all supply chain companies

An integrated food traceability approach would build and improve upon existing food tracing protocols, like the Produce Traceability Initiative, and utilize existing tracing tools, such as Critical Tracking Events (CTEs) and Key Data Elements (KDEs). This would provide benefits to all, including:

- Improved food safety via precise and efficient recalls
- New operational efficiencies gained by all members of the supply chain
- Potential revenue growth for all fresh food categories

The time has come for integrating whole-chain traceability processes across fresh food sectors as consumer demands, public health concerns, and business needs converge. Industry needs to systematically move toward this integrated whole-chain traceability process while balancing regulatory requirements and implementing proven supply chain management business practices.

## Collectively, benefits of an integrated traceability process could represent approximately $3 billion to the fresh foods industry as a whole.

## INTRODUCTION

### FRAMING THE ISSUE

The fresh foods industry is impacted by several economic and consumer trends, as well as regulatory and public health issues. These various forces have prompted the industry to come together and respond with a collaborative approach. This paper is intended to provide an overview of the most important elements that contribute to related supply chain challenges, and outline an integrated traceability approach that all subsectors of the fresh foods industry can embrace to meet the needs of consumers, the business community, and government.

**As the fresh food supply chain continues to expand globally, it is becoming more and more challenging to effectively manage food safety emergencies, such as food recalls.**

### CURRENT STATE OF THE FOOD INDUSTRY

#### Globalization and demand for diverse fresh food choices have implications for food safety

As the fresh food supply chain continues to expand globally, it is becoming more and more challenging to effectively manage food safety emergencies, such as food recalls. Consumers expect to have access to a wide variety of fresh food items from suppliers all over the world—resulting in a dramatic increase of fresh foods imports to the United States.

In addition, 94 percent of Americans also expect quick and accurate tracing of fresh food items from production to point of sale or service when food safety problems arise. (**Source:** Hart Research/Public Opinion Strategies, "Americans' Attitudes on Food Safety," 2010.)

**Foodborne illnesses from contaminated food cause approximately $152 billion a year in total healthcare costs.**

#### Cost to industry - Public health and economic ramifications of contaminated food

Contaminated food presents significant health-related damages to the public and economic costs to the fresh foods industry. Foodborne illnesses from contaminated food cause approximately $152 billion a year in total healthcare costs. (**Source:** Produce Safety Project at Georgetown University.)

Examples of significant recalls in recent years include:

- 2006 spinach recall cost the spinach industry $37 to $74 million in immediate economic losses, and $350 million in the year following the recall
- A mistaken 2007 *Salmonella* finding in tomatoes cost Florida's tomato industry $500 million
- 2008 recall of 143 million pounds of beef cost the Westland/Hallmark meat company about $117 million
- 2009 *Salmonella* outbreak in peanut butter cost U.S. peanut producers $1 billion
- German bean sprout crisis in May 2011 triggered a consumer panic in Europe and was estimated to have cost farmers $244 million a week
- *Listeria*-infected cantaloupe recall in September 2011 caused hundreds of illnesses and 30 deaths (**Sources:** Economic Impact of Recent Food Safety Incidents, Democratic Policy and Communications Center, United States Senate; Produce Safety Project funded by Pew Charitable Trusts, Georgetown University; Impact of Food Recalls, Guardian Food Services LLC.)

The fresh foods industry is now approaching a significant cross road. Establishing a comprehensive system for product traceability and food safety would reduce both the public health and financial damages associated with food recalls. By recording relevant data in a standardized format at all major events throughout a product's path from supplier to consumer, companies within this system could not only meet regulatory requirements, but would also have the ability to react quickly and with surgical precision to recalls.

**2006 spinach recall cost the spinach industry $37 to $74 million in immediate economic losses, and $350 million in the year following the recall.**

### Health risks associated with contaminated food result in loss of consumer confidence

Because of shifting demographics (i.e. increasing elderly population) in the United States, a growing population of individuals is especially at risk for foodborne illness. Contaminated fresh food items pose serious health risks to consumers and, in extreme cases, can even result in death. As a result of several recalls of potentially dangerous foods, consumers are now demanding that the food industry enhance its safety protocols and develop more efficient processes to be able to react to food safety emergencies quickly and accurately. In fact, 94 percent of Americans support the enforcement of a tracing system that enables the Food and Drug Administration (FDA) to trace food back to its original source. (**Source:** Hart Research/Public Opinion Strategies, "Americans' Attitudes on Food Safety," 2010.)

**Government agencies have also expressed concern over the health and financial impact of recent food recalls, as foodborne illnesses impact 48 million people a year.**

Consumers also want access to more information about the fresh food products they are purchasing from retailers and at foodservice establishments. In response, some fresh foods brands allow consumers to access tracing information for their products—from their web or mobile device. While whole-chain traceability does not necessarily mean that all information from the supply chain will be available to anyone who wants it, it enables better and more controlled information sharing between trading partners.

### Health and healthcare cost ramifications

Government agencies have also expressed concern over the health and financial impact of recent food recalls, as foodborne illnesses impact 48 million people a year (**Source:** Centers for Disease Control and Prevention) and cost the United States $152 billion in healthcare costs every year (**Source:** Produce Safety Project at Georgetown University).

### FDA/FSIS investigation and IFT Task Order 6

There are several pending bills that would require the Food Safety and Inspection Service (FSIS) to easily trace the movement of products. The goal is to better determine a product's source and enable companies to remove potentially harmful products from the supply chain.

In 2008, FDA and Food Safety and Inspection Service (FSIS) officials began to initiate investigations and discussions about the "need to increase the speed and accuracy of traceback investigations and trace forward operations" in light of foodborne illness outbreaks.

The FDA contracted the Institute of Food Technologists (IFT) to identify current and future product tracing systems; review tracing processes from harvest through processing and distribution to points of consumption; examine the accessibility of information to public health and regulatory officials; and consider the cost implications.

A mock tomato recall was conducted by the IFT and the suppliers of contaminated products could not be properly identified. As a result of these findings, IFT submitted a full report to FDA recommending the concepts—and usage of— Critical Tracking Events (CTEs) and Key Data Elements (KDEs) in support of data capture for traceability. (See Business Case section for definitions of CTE and KDE.)

### Proactive approach taken by industry

While the diversity and complexity of the food supply chain hamper the pace of industry-wide change, the damages caused by past food recalls have influenced individual companies, trade associations, and voluntary groups to better define their own traceability process needs. Industry sectors are beginning to see the overall benefits of traceability, and collaboration among stakeholders and with government agencies is expected to yield a regulatory framework in which all participants can achieve their varied, yet related, objectives.

Existing sector-specific traceability programs provide a good foundation for an integrated whole-chain traceability process; and these sectors are beginning to work together to leverage each other's learnings.

**Figure 4:** PTI compliant case label encoding barcode with GTIN and Batch/Lot data for traceability.

Commodity

Pack Configuration

GS1-128 Barcode encoded:
AI 01 = GTIN
AI 10 = Batch/Lot Number

PTI Voice Pick Code

ORANGES, NAVEL
8 - 5lb BAGS

(01) 10614141007346
(10) E00143440

22 **23**

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As an example, in 2008, The Produce Traceability Initiative (PTI) was created to address case-level traceability with the active involvement of working groups representing every aspect of the produce supply chain. PTI incorporates the use of GS1 Standards for product information to efficiently track products and establish electronic recordkeeping of product data from farm-to-store or farm-to-restaurant. The reason the PTI decided to use GS1 Standards is that the grocery channel is already heavily invested in these standards for consumer packaged goods.

There are seven milestones for proper and complete implementation of the Produce Traceability Initiative:

**M1** - Obtain a GS1 Company Prefix

**M2** - Assign Global Trade Item Numbers (GTINs)

**M3** - Provide GTIN® information to buyers

**M4** - Show human-readable information on cases

**M5** - Encode information in a barcode

**M6** - Read and store information on inbound cases

**M7** - Read and store information on outbound cases



## The greatest value of standardized data lies in trading partners' ability to share this information and "see" what's happening along the supply chain.

Other fresh foods sectors, such as seafood, are also recognizing the importance and usefulness of applying milestones and traceability guidelines to help adoption and implementation.

The Meat and Poultry B2B Data Standards Organization (mpXML) is pioneering the development and use of the standards that support product identification and data sharing as published in the Traceability for Meat and Poultry U.S. Implementation Guide in June 2010.

Developed by the National Fisheries Institute (NFI), GS1 US, and U.S. seafood industry stakeholders, the U.S. Seafood Traceability Implementation Guide provides practical guidance for industry-wide seafood traceability.

Common to all of these industry efforts is the emphasis on unique product identification with a globally proven standard. Once the product has been uniquely identified and its information captured in an electronic recordkeeping system, the greatest value of standardized data lies in trading partners' ability to share this information and "see" what's happening along the supply chain. The internal and external linkages (see illustrations from page 6 to 11) illuminate the product's lifecycle along its journey from source to consumption, resulting in true "supply chain visibility."

## BUYER OPERATIONS STUDY

In 2011, GS1 US conducted a Fresh Food Buyer Operations Study with meat, seafood and produce suppliers, distributors, retailers, and restaurant operators.

### The objectives of the study were to:

- quantify the benefits of adding standardized barcodes to fresh food cases
- identify supply chain productivity improvements
- measure the value of faster surgical recalls
- understand the potential to drive higher sales by adding transparency to a supplier's product
- identify the incremental value to the supply chain of adding barcodes to products
- assess how the value of the barcodes varies by fresh category
- identify opportunities for further alignment of traceability requirements

### Participants and methodology

The Buyer Operations Study participants included suppliers of meat, seafood, and produce products, as well as distributors, foodservice operators, and retailers. These organizations agreed to an on-site visit in order to track data pertaining to retailers, distributors, and suppliers/growers.

Retail specific processes observed were:

- receiving of fresh cases
- cashier check-out of coded and non-coded items
- product reordering/inventory management
- processes related to minimizing shrink and restocking of product.

On-site visits at distributors aimed to observe:
- product receiving
- pallet breakdowns
- product shipment

On-site visits at suppliers/growers aimed to observe:
- initial product receipt and identification
- blast chilling
- product shipment

### Findings

Data collected in the study correlated into three separate categories:

- traceability
- cost reduction
- increased sales

There are substantial benefits throughout the supply chain if all fresh products use standard product identification and are barcoded at the case level with traceability information. Additionally, the study uncovered value in these three areas when GS1 Barcodes were also implemented at the item level.

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**FOLLOW STANDARDS IN ACTION ACROSS THE SUPPLY CHAIN**

Across the supply chain, trading partners are connecting with each other and leveraging the power of information by using GS1 Standards as the foundation of their business processes.

## GROWER: HARVEST



**LOCATION IDENTIFICATION**
**GLN** Global Location Number
0614141004577

**CASE LEVEL IDENTIFICATION**
**GTIN** Global Trade Item Number
**and Extended Data**
Batch/Lot Number

**ENTER YOUR PRODUCT DATA**
GTIN
Dimensions Weights
Nutritional Allergens
SEND

**Note:** These graphics illustrate the flow of product data along the produce supply chain. Business processes may vary in other fresh foods industry segments.

### IDENTIFY
- GTINs are created for each product and case
- SSCCs are created for each pallet packed in the field
- Product data is defined, created, and managed
- Grower GLNs are assigned and managed

### CAPTURE
- Batch/Lot Numbers are captured for each case of product packed
- GTINs and production data (Batch/Lot Number, Date, etc.) are printed on cases (barcode and human readable)
- Pallet tags are created and printed using the SSCC

### SHARE
- Product data is shared

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### BENEFITS
- Enables consumer brand recognition
- Establishes the foundation for product traceability and recall
- Optimizes business processes based on accurate product identification for real-time harvest updates and efficient logistics operations

## BUSINESS CASE FOR AN INTEGRATED TRACEABILITY PROCESS

### POTENTIAL SOLUTION

The vision of an integrated fresh foods traceability process is attainable. The produce industry, for example, has progressed toward case-level traceability—with the guidance of seven milestones established by the Produce Traceability Initiative. The final milestone of reading and storing information on outbound cases is now seen by many in the PTI as within reach. Other sectors are now using the PTI roadmap model as an effective means to galvanizing trading partners to define their own criteria for traceability adoption.

In addition to the obvious health and social benefits, 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.
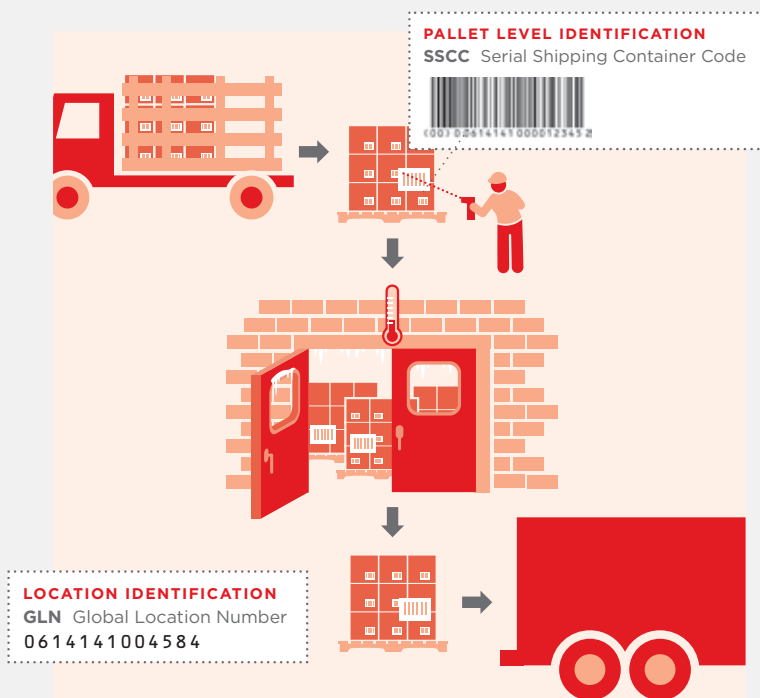
What strengthens the probability of success is the availability of commercial hardware and software tools that can be easily integrated across supply chain roles and companies –essentially achieving data and process management. Interoperability can be (and in many cases already is) made possible by unique identification of products and locations, commonly defined events taking place along the supply chain, and these events being communicated in a standardized data format.

While we call these elements foundational, it is still a challenge when it comes to implementation across entire industries. However, when these foundational elements are in use, query-based tools allow for data sharing among trading partners.

> In addition to reducing the economic impact of food safety emergencies, "visibility" into their supply chain helps companies achieve operational efficiencies and process improvements.

## GROWER: RECEIVING AT COOLER



**PALLET LEVEL IDENTIFICATION**
**SSCC** Serial Shipping Container Code

**LOCATION IDENTIFICATION**
**GLN** Global Location Number
0614141004584

**IDENTIFY**
- Validated customer GLNs are collected and stored

**CAPTURE**
- Barcodes are used to track product as it moves from the field, to the cooler, to storage, to shipping
- GTINs and SSCCs are used to track contents of shipments

**SHARE**
- Harvesting data is stored in Enterprise Resource Planning (ERP) system
- Inventory and delivery information is stored in ERP system
- Advance Ship Notices (ASNs) containing SSCCs, GTINs and their corresponding Batch/Lot Numbers, and GLNs are sent to customers

**BENEFITS**
- Improves visibility into product movement
- Provides operational efficiencies in receiving, inventory management, and shipping processes

## TRACEABILITY BENEFITS

Anticipated government regulation is one of the main drivers for more sophisticated tracing systems, according to various members of the fresh foods industry. FSMA explicitly calls on the FDA to evaluate the costs and benefits associated with the adoption and use of several product tracing technologies, and a proactive industry approach can only help to create and implement whole-chain traceability that is in the best interest of all stakeholders.

### 1. Meeting regulatory requirements

As mentioned earlier, FDA and FSIS issued a Federal Register Notice in 2009 that called for external suggestions to improve food traceability. Specifically, these two organizations sought to increase the speed and accuracy of fresh food traceability via electronic data in order to minimize the negative economic and health impact of food recall events.

One of the direct results of this effort was the introduction of Critical Tracking Events (CTEs) and Key Data Elements (KDEs). CTEs are those points along the supply chain where information must be recorded for the effective tracing of product. They include points where the product changes hands from one supply chain participant to another, where product is moved between premises, or is transformed or otherwise determined to be a point at which information must be captured for product tracing.

Key Data Elements contain information collected at each CTE. To enable product traceability, KDEs answer the questions "what, when, where and why" in support of each CTE. They include (but are not limited to) original source ID (i.e. farm), harvest date, ship date, destination ID, case or pallet ID, and receipt date.

These concepts provide a solid foundation for an integrated whole-chain traceability process, and complete implementation will provide the fresh foods industry with many benefits. In addition to reducing the economic impact of food safety emergencies, "visibility" into their supply chain helps companies achieve operational efficiencies and process improvements to varying degrees based on the specifics of each situation.

**Critical Tracking Events are those points along the supply chain where information must be recorded for the effective tracing of product.**

## PACKER/SHIPPER



**GROWER**

**LOCATION IDENTIFICATION**
**GLN** Global Location Number
0 1 2 3 4 5 6 7 0 0 0 0 0 0

**PALLET LEVEL IDENTIFICATION**
**SSCC** Serial Shipping Container Code

**PACKER/ SHIPPER**

### IDENTIFY
- Validated customer GLNs are collected and stored
- GTINs and Batch/Lot Numbers are created for repacked and commingled products and cases
- SSCCs are created for new pallets

### CAPTURE
- GTINs and SSCCs are used for receipt verification
- GTINs are used to assure accuracy of picked products for re-packing and commingling
- GTINs and Batch/Lot Numbers are used to create and track shipments
- Shipping unit content is barcoded with SSCCs

### SHARE
- ASNs containing SSCCs, GTINs, and their corresponding Batch/Lot Numbers and GLNs are sent to customers
- Inventory and delivery information is stored in WMS system
- EDI processes are synchronized
- Orders are managed

### BENEFITS
- Reduces costs and time spent on manual processes
- Enhances traceability to support safe handling processes
- Improves order accuracy

**The capability of conducting precise recalls is one of the key benefits of whole-chain traceability.**

An effective integrated traceability approach should utilize and build upon the following advantages provided by Critical Tracking Events and Key Data Elements:

- Adoption of a common set of KDEs across all levels of the supply chain and for all fresh foods, ensuring both cross-channel and cross-category commonality
- Enabling all supply chain participants to clearly delineate their responsibilities in the fresh food traceability process
- The ability to efficiently document product movement through the supply chain

These benefits are closely aligned with FDA and FSIS's original objective to improve food traceability. In summary, they address these agencies' concerns to find commonalities in traceability processes through external linkages, interoperability, and electronic recordkeeping.

To address the concerns of budgetary limitations for FDA inspections, the 2011 Food Safety Modernization Act (FSMA) focuses on preventative measures, inspections and compliance, imported food safety, and enhanced partnerships. In addition to outlining comprehensive preventative controls for food and feed facilities and produce safety standards, FSMA mandates inspection frequency, expanded access to records, and enhanced product tracing processes. It also provides directives to ensure the safety of imported food and encourages state, local, and foreign capacity building toward a more unified food traceability approach.

As farmers markets and other smaller enterprises become increasingly popular destinations for consumers buying fresh foods, FDA guidance is expected in the near future to help these outlets comply with regulatory requirements. Only 14% of farmers markets today are subject to any form of state-enforced regulation.

**The combination of increased self-scan penetration and higher efficiency in the traditional checkout lanes could represent net labor savings of approximately $20,000 annually per store, per year suggesting nearly $340 million in savings to the industry as a whole.**

## WHOLESALER



**PACKER/ SHIPPER**

**PALLET LEVEL IDENTIFICATION**
**SSCC** Serial Shipping Container Code

**LOCATION IDENTIFICATION**
**GLN** Global Location Number
0023456700003

**WHOLESALER**

**IDENTIFY**
- Validated customer GLNs are collected and stored

**CAPTURE**
- GTINs and SSCCs are used for receipt verification
- GTINs and SSCCs are used to put products into inventory
- GTINs and SSCCs are used to pick products and create shipments
- GTINs and Batch/Lot Numbers are used to rotate inventory and for quality control processes

**SHARE**
- ASNs containing SSCCs, GTINs and their corresponding Batch/Lot Numbers, and GLNs are sent to customers
- Inventory and delivery information is stored in WMS system
- EDI processes are synchronized
- Orders are managed
- Data is stored in WMS system

**BENEFITS**
- Optimizes receiving productivity
- Improves inventory management
- Increase pick rates
- Reduces errors in mispicks and shorts

## 2. Process improvement benefits

### a. Precise recalls

While grocery recalls are rare events, they have significant impact on public health or the general public and cause economic damages to the fresh foods industry when they occur.

The capability of conducting precise recalls is one of the key benefits of whole-chain traceability offering the following specific advantages:

- Eliminates 100-percent discard of potentially affected product
- Helps identify the true cause of an outbreak
- Minimizes collateral damage to supply chain participants and consumers
- Reduces unforeseen costs (legal, fines, forced renovation, lost contracts, loss of customer loyalty)

The 2006 spinach recall resulted in five deaths and the spread of approximately 200 life-threatening illnesses in 26 states coast-to-coast. The contaminated spinach originated from a single 2.8-acre field on one California farm, making the geographic spread of the illnesses even more disconcerting. Only 17 percent of Americans eat spinach, so one can imagine that the impact of a recall of a product consumed by the majority of Americans would likely be even more severe.

The spinach recall alone caused approximately $500 million in financial damage, and the subsequent loss in consumer confidence made it harder for the category to recover. Spinach sales were 20 percent below 2006 levels a year after the recall, and 10 percent below two years afterward. With the most frequent and costly recalls originating in the meat and produce industries, recalls cost the fresh foods industry more than $1 billion each year. This calculation is based on the average cost of the top recalls in fresh food categories over a period of 10 years.

With a whole-chain traceability process in place, the affected farm can be efficiently identified and isolated. In one example, Frontera Produce was able to limit the scope of a cilantro recall to just 12 percent of total cases (**Source: GS1 US case study – Frontera Produce – Traceability from Farm to Store**). A conservative extrapolation to the broader industry (25% improvement due to precise recalls instead of Frontera's 88% improvement) would suggest a meaningful opportunity for the broader fresh foods industry to save approximately $250-$275 million a year.

Frontera also cited a number of additional benefits resulting from their traceability initiative, including safety of their products, gains in productivity, and supply chain efficiencies impacting their top and bottom lines.

Enhanced supply chain visibility and consumer awareness of the merits and effectiveness of fresh food traceability should also help consumers regain their confidence in the affected product and return to their previous buying habits in a shorter period of time, helping to bring monthly product sales back to normal levels more quickly.

## DISTRIBUTION CENTER



**PALLET LEVEL IDENTIFICATION**
**SSCC** Serial Shipping Container Code

WHOLESALER

**LOCATION IDENTIFICATION**
**GLN** Global Location Number
0003456700005

RETAIL DISTRIBUTION

**IDENTIFY**
- Validated customer GLNs are captured and shared

**CAPTURE**
- GTINs and SSCCs are used for receipt verification
- GTINs and SSCCs are used to put products into inventory
- GTINs and Voice Pick Code are used to pick products and create shipments
- GTINs and their corresponding Batch/Lot Numbers and Voice Pick Codes are used to rotate inventory and for quality control processes

**SHARE**
- Inventory and delivery information is stored in WMS system
- EDI processes are synchronized
- Orders are managed

**BENEFITS**
- Optimizes receiving productivity
- Improves inventory management
- Increase pick rates
- Reduces errors in mispicks and shorts

## b. Retailer front-end efficiencies

Today, the check-out process for produce can be tedious and prone to error. If the item doesn't have a barcode, the cashier must identify the item (e.g., Fuji apple), manually look up the price look up (PLU) code, and enter the code before the register can properly price the item. The resulting keying time for a PLU averages approximately 8 seconds, as opposed to about 2.5 seconds for scanning a product with a barcode.

Grocery store checkout is perhaps the most evident part of the supply chain where improvements can be clearly achieved with the use of scannable product data. As fresh food product travels from source to a store, for example, electronic product scanning on the case or the item level could bring about the following benefits:

• Reduced manual data entry
• Improved accuracy
• Improved speed and efficiency
• Better "in-stock" data
• Increased customer satisfaction

The use of the GS1 DataBar™ allows produce scans to be linked to a number system, further linking them to other fresh food sales such as seafood, meat, and baked goods. This system plays a key role in whole-chain traceability and helps remove the possibility of human error from the scanning process.

The GS1 DataBar effectively addresses the following:

• The trend of increasing use of self-checkout lanes is likely to continue, as self-scanner equipment purchases are expected to grow by 84 percent worldwide over the next five years (**Source:** VDC Research Group). Since errors are more likely as a result of manual input than an automated process, costs associated with human error during checkout will only get worse without unique product identification achieved with a barcode like the GS1 DataBar that focuses on electronic data transfer.

• Customers will also use self-scanners more frequently if all fresh food products are barcoded, allowing for ease of scan. Self-scan usage in an average grocery store with at least one self-checkout lane is about 20 percent. Customers often cite difficulty of produce items and large basket sizes as the primary reasons for avoiding self checkout. Therefore if easier-to-scan fresh foods could drive even 5-10 percent higher scan penetration, this would represent about 40,000 transactions per year that no longer need a cashier. Assuming an average basket size of 10 items for self-checkout, this would save more than $10,000 per store, per year. This calculation is based on source information from trade association research data and expert industry observations.

> **Grocery store checkout is perhaps the most evident part of the supply chain where improvements can be clearly achieved with the use of scannable product data.**

## POINT OF SALE OR SERVICE



**LOCATION IDENTIFICATION**
**GLN** Global Location Number
0000456700004

GROCERY

RETAIL DISTRIBUTION

**CASE LEVEL IDENTIFICATION**
**GTIN** Global Trade Item Number
**and Extended Data**
Batch/Lot Number

**PRODUCT DATA FROM GDSN**
GTIN
Dimensions   Weights
Nutritional   Allergens
DOWNLOAD

**IDENTIFY**
• Validated customer GLNs are captured and stored

**CAPTURE**
• Cases are identified during picking/shipping processes at the distribution channel and tracked to validate delivery to correct location with GLN completing transfer of ownership
• GTINs and corresponding Batch/Lot Numbers are used to drive inventory replenishment

**SHARE**
• PO with GTINs and corresponding Batch/Lot Numbers for each case are sent by the distribution channel
• EDI processes are synchronized
• Orders are managed
• Inventory and delivery information is stored in ERP system
• In time, industry supported recall notifications for specific GTINs and associated production data could trigger automatic reports alerting store and restaurant operations of potential issues

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**BENEFITS**
• Increases operational efficiencies across various business processes
• Improves preparedness for fast and precise recalls
• Provides additional product information to enhance operations for traceability
• Enables consumer protection

The GS1 DataBar barcode on each item gives retailers point-of-sale information.

- Retailers would also experience savings in traditional checkout lanes as cashiers can typically process barcoded items about five seconds quicker than they can process a PLU item. Even factoring in the need to weigh variable weight products, expert industry observations suggest that with product identification in place, a fresh food item can be scanned three seconds quicker. Therefore, the combination of increased self-scan penetration and higher efficiency in the traditional checkout lanes could represent net labor savings of approximately $20,000 annually per store, per year suggesting nearly $340 million in savings to the industry as a whole.

**Given average yearly fresh food sales of about $255 billion, improved inventory and ordering could allow retailers to save approximately $60,000 per store, per year.**

## c. Inventory management and more accurate ordering

Those retailers and food service companies interviewed by GS1 US in the Buyer Operations Study acknowledged that they manually execute most of their inventory orders, and indicated that there is significant room for improvement for these processes. In fact, one of the "Big 3" traditional supermarket companies indicated that inventory values were only available at department levels, but not at category or item levels.

The use of barcodes on fresh food products at the case and item level should reduce inventory management inefficiencies and produce the following benefits:

- Improved product availability by reducing fresh out-of-stock rate to dry grocery out-of-stock rate
- Improved inventory rotation
- Improved inventory accuracy and forecasting
- Reduced labor costs as a result of automation
- Lost sales avoided

Given average yearly fresh food sales of about $255 billion (**Source:** The Nielsen Co., Homescan Consumer Facts 2010 Report, 52 weeks ending, Dec. 25, 2010; Progressive Grocer Market Research, 2011), improved inventory and ordering could allow retailers to save approximately $60,000 per store, per year. This calculation is based on a combination of trade association research data, industry observations and generally accepted industry expert assumptions. Additionally, the industry should be able to save about 10 million labor hours per year by moving inventory level measurement from a manual to an automated process, resulting in a yearly labor cost reduction of $6,000 per store, per year.

### d. Improved shrink management

Even the most sophisticated retailers currently stock their fresh food shelves through a process resembling "first in, first out." Products are unloaded from delivery trucks and stored in distinct areas of the back room. Department managers then stock the shelves with the older product first to minimize shrink. Retailers have little upstream information that helps them make more effective decisions on which products to stock first.

An analysis of data captured through the scan of a barcode along with the information describing the "what, when, where, and why" enables several process improvements and benefits, including:

- Date processing (when does product expire and is it on promotion)
- Improved most-used product placement
- Improved stock accuracy

The shrink reduction benefits provided by a whole-chain traceability process are not limited to one level of the supply chain.

One of the retailers interviewed by GS1 US discussed that they rarely scan out their fresh food shrink, particularly produce items, before disposing of it. An integrated traceability process that includes outbound data capture would enable retailers to better identify shrink values (while meeting the need for complete traceability).

Distributors can take advantage of a similar process when determining which products to ship to retailers and food service companies. Scanning fresh food cases in inventory should minimize shrink caused by products remaining in the inventory shelves after their expiration date.

Suppliers can also scan product data to ensure that they are shipping the correct products at the optimal times to distributors and retailers. When the wrong fresh foods are shipped and received, these products generally are discarded, rather then returned. In addition, scanning each case or pallet determines the relevant information necessary to reduce human errors and minimize shrink levels.

Overall, suppliers, distributors, retailers, and food service companies could reduce their shrink by 25 percent, leading to shrink reduction savings of $90,000 per year per location across the entire supply chain. This implies a total savings from process improvements of about $180,000 per location, per year.

### 3. Improved customer offering

#### a. Increased customer confidence

Consumers today are very concerned about food safety with 94 percent of them favoring a required traceability program for the fresh foods industry. Full traceability information would enable enhanced supply chain visibility and faster and more accurate product recalls, increasing customer confidence in product quality and safety.

In a case study documented by GS1 US, customers of SunFed, a full-service fresh produce company, are given "greater control and peace of mind" through the item-level traceability they are provided. Information about where and when SunFed produce was grown and picked, whether it's subject to recall, nutrition information of the product—even recipes—are directly available to the consumer.

More data-driven traceability processes empower increasingly discriminating consumers to validate product information relative to:

- Freshness
- Nutritional value
- Allergen content

Additionally, fresh food item-level barcodes would offer a distinct competitive advantage in several specific product segments, in which consumers are particularly demanding about the authenticity of product information. These product segments include vegetarian, vegan, halal, kosher, organic, fair trade, and functional foods.

Whole chain traceability helps establish and improve consumer confidence for all consumer segments, resulting in potential sales lift for the fresh foods industry.

**Whole chain traceability helps establish and improve consumer confidence for all consumer segments, resulting in potential sales lift for the fresh foods industry.**

### b. Branding and center-store type promotions

Traceability information can also unlock opportunities for:

- Increased brand recognition and reputation for buyers, retailers, consumers
- Premium merchandising placement based on product movement
- Improved retail store customer loyalty

There is currently little brand differentiation among fresh food suppliers at the consumer level. For example, the apples on display at an average grocer may come from many different suppliers, but consumers have no way of knowing this. Major suppliers like Chiquita and Dole have been able to establish brand recognition in the consumer marketplace, but to date, the opportunities for smaller suppliers to do the same have been negligible.

The use of case and item-level barcodes needed for traceability would also give fresh food suppliers the ability to differentiate their brands to both consumers and retailers. In other words, enhanced product data and analysis are likely to influence brand awareness and reputation to the point where buyers and consumers will make purchasing decisions based on brand name, rather than on commodity, favoring those brands that can demonstrate quality and freshness.

**Note from a technology provider:** HarvestMark, a leading provider of traceability solutions with more than 300 produce clients, states that several of their customers (suppliers) have impressed and pleased retailers with their traceability program. One major club retailer actually requires traceability for certain commodities. Because most traceability programs are very new, sales upsides have yet to be quantified. However, many of the organizations that partner with HarvestMark cite traceability as a key to winning business with retailers, and once item-level scans are more effectively marketed to shoppers, they are expected to have a similar effect on individual customers.

Traceability information also enables supply chain merchandising partnerships. Suppliers who can provide proof of product movement through the supply chain have the opportunity:

- to enter into vendor funding agreements
- to secure premium placement
- to tap into more sophisticated, incremental promotions
- to gain center-store type merchandising

This offers the ability to showcase products, enhance brand recognition, and increase consumer loyalty—not only for the product but also for the store where these products are available.

### c. Direct interactions with consumers

Full traceability will close the communication loop in the supply chain, allowing fresh food suppliers to observe point-of-sale demand and communicate directly with the end consumers. Suppliers will be able to receive and react to feedback about their products to enhance the quality and competitiveness of their offering.

**Note from a case study:** Matt Mandel, Vice President of Marketing & Sales at SunFed stated: "Now that we have item-level traceability—and the ability to hear directly from our end-consumers—we have instant and constant feedback which is another big part of who we are and what we do." (**Source:** GS1 US case study; Sunfed: Produce You Can Trust and Trace.)

56 percent of Americans want access to product traceability information via barcode scanning with their smartphones, according to a 2008 study. (**Source:** Elliott Grant, 2008. Produce Traceability. Its Relevance and Applications. YottaMark Knowledge Paper #3/08.)

**Full traceability will close the communication loop in the supply chain, allowing fresh food suppliers to observe point of sale demand and communicate directly with the end consumers.**

Whole-chain traceability is currently a competitive advantage, but as consumers continue to demand more information on fresh food products, it will become a necessity for all fresh food companies. Some organizations have acknowledged this and are positioning themselves to capture early-mover benefits.

**Note from a technology provider:** One application offered by HarvestMark allows consumers to use a smartphone to access expanded information about products, provide feedback to the supplier, distributor or retailer, and even rate the product. This provides suppliers with direct, real-time reactions to their products and allows them to more precisely align their production to customer demand.

HarvestMark has tracked more than 4.7 billion produce packages to date, and partners with several retailers, like Kroger, to provide traceability for their corporate brand of produce. Currently, consumer trace rates range between 0.01 percent to 0.3 percent depending on the product. These rates increase 25 fold when there is a recall on a product, further illustrating the growing importance of whole-chain traceability to consumer confidence. Trace rates are expected to increase dramatically over the next five years as more and more shoppers carry scan-capable phones, as incentives to trace accrue, and as consumer awareness grows.

## SUMMARY OF BUSINESS CASE

Given current and future consumer demand and increasing pressure for government regulation, whole-chain traceability processes must and will exist. An integrated traceability approach for fresh foods developed by industry itself would offer more widespread benefits to all participants in the supply chain.

Broad adoption of whole-chain traceability is likely to create significant opportunities for each participant to realize process efficiencies, cost savings, incremental revenue growth, and other benefits, including:

- Decreased economic damages following a food recall due to isolation of affected products and more efficiently restored consumer confidence
- Significant process improvements such as labor savings from PLU item scanning and increased self-checkout penetration, better inventory management, more accurate ordering, improved product availability, and improved shrink management
- Enhanced consumer offering through increased consumer confidence, branding and center-store type promotions, and more direct interactions with consumers

Collectively, these benefits could represent approximately $3 billion to the fresh foods industry as a whole.

## 4. Costs of Implementation

Some fresh food companies may believe that the costs of technology and labor associated with the implementation of an integrated traceability system will outweigh the benefits. However, the net costs of whole-chain fresh food traceability are less than what many suspect. In fact, many short and long-term supply chain efficiency benefits have already been identified through the implementation of traceability programs. The consumer packaged goods industry, along with several subsectors in the fresh foods industry, has already implemented traceability to various degrees, so the building of an integrated process for all fresh food categories will not need to start from scratch. Many of the learnings from standardized product identification implementations will also help minimize costs.

**The consumer packaged goods industry, along with several subsectors in the fresh foods industry, has already implemented traceability to various degrees, so the building of an integrated process for all fresh food categories will not need to start from scratch.**

### a. Technology costs

The expense of purchasing, installing, and operating the necessary technology to fully trace fresh food products may be the most costly element of a traceability program.

The primary costs concerning technology will include:

- Enhancements to the hardware and software needed to support traceability
- Infrastructure investments to modify and update current system
- Training all suppliers, processors, distributors, retailers, and food service supply chain participant associates about the use and value of traceability technology

Technology providers who recognize the importance of interoperability and are developing solutions to support traceability needs throughout the entire supply chain will deliver the most value.

Technology costs will vary depending on:

- the size and type of organization
- degree of difficulty in modifying internal systems
- training requirements for implementation

**Notes about technology costs from technology providers:** There are numerous technology providers offering solutions—at various price points—for implementing traceability processes in the fresh foods industry. Many of them are listed on the Produce Traceability Initiative website at www.producetraceability.org.

For a small/medium grower or shipper that needs to label around a million cases a year in a single facility, HarvestMark estimates the hardware costs to be around $3,000, software licenses and data hosting between $2,000 to $3,000, and about $0.005 per case for labels.

In a pilot project with supply chain partners, technology provider FoodLogiQ implemented its software to address compliance needs for FSMA. The solution was to develop traceability capabilities for inbound, slotted, and outbound product to increase process efficiencies. The cost vs. benefit assessments of the project were summarized this way:

"The key benefit for us is having a real-time, automated inventory control system, versus the manual system we've had in place, and being able to make decisions both in sales and production on what we have available to us in real time," according to Tom Clark, Operations Manager at LoBue Citrus, as quoted in *Data Collection.* "…Given the early improvements, Clark believes the system will pay for itself in two years, and all subsequent gains beyond that will further help the business."

The costs included the following:

**Web-based software:** $1,800 per year

**Installation fee:** $1,000 per day (no more than an afternoon for installation in most cases)

**Web training cost:** $1,000 per day. Suppliers require 4-6 hours of training (~$625). Processors and distributors require 2-3 days (~$2,500) due to an increased number of processes such as receiving, picking requirements, and shipping. Retailers and food service companies require 1 day per location (varies dramatically depending on size of the organization and how effectively multiple trainings can be administered in a central location).

Warehouse management system enhancement costs for the retailer in this example included the modification of its existing WMS to be able to process SSCCs, GTINs, Batch and Lot Numbers, and ASNs. The total cost of $75,000 also covered training and support for a large packing shed with multiple lines, allowing the retailer to meet the last two milestones for PTI—reading and scanning information on inbound and outbound cases.

According to Mike Bove, VP of Perishable Procurements, Associated Grocers, quoted in a FoodLogiQ case study, "Scanning GTIN label barcodes makes our information 100 percent accurate. It eliminates rework and frustration at the store level. We have proof that the product was on the truck, so there won't be short order reports, and we won't have to rework invoices because the system is more accurate. ...Bove expects to see an increase in gross profit and labor savings both at the wholesale and retail level with these improved efficiencies."

Additionally, a food services group approximates an overhead cost of $3 million in IT infrastructure investments to purchase, implement, and operate the system. This covers their 400 suppliers, 50 distributors, and 20,000 stores. This same participant (that implemented software other than FoodLogiQ) reported that a one-time training was not always sufficient, and that on-site monitoring throughout initial stages of the process was necessary. They estimated training and support costs at about $100 per store.

**An integrated traceability approach will provide numerous benefits to the fresh foods industry in improved traceability and food safety, more effective business processes, and opportunities for incremental revenue growth.**

## b. Labor costs

Electronic traceability could potentially reduce labor costs in many parts of the supply chain, as described in the benefits section. However, there are some aspects of a traceability system that will require labor adjustment at certain steps of the supply chain. These adjustments include:

- Physically operating and programming the technology
- Manual vs. automated application of product identification and data capture
- Adjust labor assignments based on process changes

A well designed solution must be easily and fully integrated into the current system to minimize additional labor cost. As an example, HarvestMark uses in-line printing and scanning for a number of products to reduce manual application of labels in automated packing facilities.

Another provider, FoodLogiQ cites increased labor costs to create PTI compliant Hybrid Pallet Labels based on PTI compliant case labels. Personnel with increased technical skill to manage mobile scanning equipment and the time to physically scan and print labels are both required. During pilots, FoodLogiQ found that these costs were mostly offset because shipping and packing personnel often have wait time during which they can label pallets and increase order fulfillment accuracy, and reduce misshipments.

By having an automated system in place to take inventory, another company working with FoodLogiQ was able to save eight to 16 hours of labor each day translating to $96 to $240 saved in labor costs per day. Overall, labor costs should not increase significantly for any one organization, once workers get accustomed to new processes.

## c. "Unknown costs"

There may be some short-term costs the fresh foods industry will have to absorb as it adjusts to an integrated approach to traceability. These costs should decrease significantly once the system becomes completely integrated into all facets of supply chain operations, but until then they may include:

- Resolution of disputes (i.e. litigation) between supply chain participants regarding who is responsible for different tracing documentation duties
- Realignment of vendor relationships. As supply chain companies begin to adopt this integrated initiative, retailers and food service companies may choose to do business only with suppliers and distributors who have implemented this system. Therefore, vendor relationships that previously had been in good standing may be discontinued, leading to revenue losses for suppliers and distributors who do not adopt the initiative.

**Based on the accomplishments of various fresh food sectors toward traceability with the use of GS1 Standards, it would be in the best interest of all stakeholders to widen adoption of GS1 Standards across all food categories and expand implementation of traceability processes.**

### 5. Implementation Challenges

In addition to the costs described above, there are other less tangible challenges in implementing an integrated approach to traceability. The most significant of these barriers are the possibility for increased government regulation and the inherent challenges of finding alignment across different industry sectors.

It is enhancing food safety with traceability that is the common objective that both regulators and industry participants aim to achieve. Based on the accomplishments of various fresh food sectors toward traceability with the use of GS1 Standards, it would be in the best interest of all stakeholders to widen adoption of GS1 Standards across all food categories and expand implementation of traceability processes.

One of the major obstacles facing an integrated traceability process is the challenge of getting multiple stakeholders aligned. Any traceability system will have inherent economies of scale; as more companies adopt a system, it should become significantly more effective. However, it may be difficult at first to obtain a full commitment from all supply chain companies, as they may be resistant to industry-wide change. Low adoption may reduce the benefits of the implementation of a traceability system. The same issue may arise if multiple traceability systems are developed and end up competing against each other for participation. Such a scenario would force the government to regulate the industry instead.

### Myth vs. Reality

Some of the misperceptions that may be held by the fresh foods industry that could hinder the adoption of a traceability system are addressed below:

**Myth:** The benefit doesn't justify the cost.
**Reality:** Companies generally overestimate the costs of installing and operating a whole-chain traceability system. A traceability system should provide economic benefits that outweigh its costs of implementation for all supply chain members.

**Myth:** Traceability has nothing to do with efficiency.
**Reality:** A fully integrated traceability system can provide operational efficiencies for all supply chain participants. It should assist the inventory and shrink management systems for all members of the supply chain, in addition to making retailers' front-end operations more efficient.

**Myth:** The Global Trade Item Number® (GTIN) process is difficult.
**Reality:** There are easy-to-use online tools available, including Data Driver by GS1 US, to help companies create and manage their GTINs. There may be an initial adjustment period for employees who previously used manual entry processes, but the automated processes that GTIN scanning provides will allow companies to better manage traceability, their inventories and shrink levels.

**Myth:** Global Location Numbers (GLN) are unnecessary.
**Reality:** Location identification is essential to the success of an electronic whole-chain traceability system, particularly as fresh foods are sourced globally. Since GLNs are globally unique identification numbers in the GS1 System of standards, often referred to as the global language of business, they allow supply chain participants to communicate effectively about their business processes.

**Myth:** Traceability is a huge IT challenge.
**Reality:** Findings of various pilot projects and case studies confirm that companies often overestimate the technology challenges in implementing traceability processes. To read case studies about traceability implementations, please visit www.gs1us.org/fresh-foods/tools-and-resources.

**Myth:** We already have a traceability process that works. We've had no problems using manual systems to track the products we ship and/or receive.
**Reality:** Even if a supply chain company has had no entry errors with a manual entry process (a highly unlikely situation), there are still incentives to adopt electronic traceability processes. Electronic scanning will eliminate manual entry errors and ensure greater accuracy in tracking the movement of products along the supply chain.

**Myth:** We maintain the highest food safety practices and have never been subject to a recall, so this initiative does not add any value for us.

**Reality:** While a company may not have been linked to a food safety emergency before, this does not guarantee that they will not be in the future, or even that their products have always been completely safe in the past. The sources of most food related illnesses are never identified. For example, for every one confirmed case of fresh food-caused salmonellosis, at least 29 others go unreported (**Source:** http://www.msnbc.msn.com/id/44701461/ns/health-food_safety/t/tainted-seafood-reaching-american-tables-experts-say/). An electronic-based system will also allow companies to eliminate manual entry errors and precisely track where products go once they leave their possession.

**Myth:** The cost is disproportionately high for small companies, especially suppliers.

**Reality:** Overhead costs may present small companies with up-front cost burdens, but the benefits provided by accurate product tracing outweigh these costs. In the past, a recall may have disproportionately affected small suppliers if they created the product in question. Because of their size, they may not have had enough additional revenue streams to counter the severe drop in sales of this product, even if their products were healthy. Such a crisis may have put them at risk of having insufficient cash flows or even liquidation. Whole chain electronic traceability should serve as a form of insurance against such losses, as a small supplier can prove that their products did not cause any illnesses and are likely to be safe.

**Myth:** This initiative is all about recalls, which do not cost retailers anything; therefore there is no reason for retailers to participate.

**Reality:** Even if a retailer does not have to pay any up-front costs in the wake of a food recall, their sales can easily suffer after one. Consumers lose confidence in retailers that sell unsafe products; some even refuse to purchase fresh food from them again if a food safety emergency has negatively affected their health. Surgical recalls should limit health damages in the future, thereby reducing customer attrition caused by loss of consumer confidence.

**Myth:** There's no need for retailers to display an item ID.

**Reality:** Consumers today demand more information about the products they consumer and by displaying a GS1 Identification, retailers will gain a key customer interaction channel to satisfy this demand. Using GS1 Identification as the foundation of traceability information will enable retailers to share information with consumers through smart-phone applications. Allowing consumers to see the source of a fresh food product should help restore consumer confidence and may lead to potential revenue growth in fresh food categories.

## CONCLUSION

Integrated traceability has the potential to transform the fresh food supply chain—improving food safety and recall response, enabling more efficient business processes, and creating opportunities for significant revenue growth. The approach benefits from a virtuous cycle of economies of scale as more participants adopt traceability. By using GS1 Standards, companies will gain the visibility to the supply chain necessary to deliver fresh, safe, high-quality food well into the 21st century and respond to the changing demands of consumers. The food industry can reap the following benefits:

- Move fast in the event of a food recall, accurately target only the affected products and suppliers
- Minimize the collateral damage of lost sales
- Minimize public health risk by speeding up the recall process
- Restore consumer confidence and define their own means of regulation

Aligning traceability practices across all stages of the supply chain will allow each supply chain participant to achieve various operational efficiencies, including:

- Manage inventory more effectively
- Reduce shrink levels
- Reduce labor costs

Integrated traceability has the potential to transform the fresh food supply chain—improving food safety and recall response, enabling more efficient business processes, and creating opportunities for significant revenue growth.

## Glossary of Terms

**CAO** – Computer Assisted Ordering: an automated product ordering system that uses point-of-sale data and historical product movement to predict demand and place orders.

**CTE** – Critical Tracking Event: a major event in the path of a product from harvest to purchase. CTEs include any product aggregations or points where the product changes hands from one supply chain participant to another.

**EPC®** – Electronic Product Code™: a code that provides a unique, serialized identifier for any kind of object.

**EPCIS** – Electronic Product Code Information Service: an interface standard designed for data exchange about physical events

**ERP** – Enterprise Resource Planning: software that merges an enterprise's financial and operational functionalities with consumer facing technology.

**FDA** – Food and Drug Administration: an agency of the U.S. Department of Health and Human Services, responsible for protecting and promoting public health through the regulation and supervision of food safety among other things.

**FSIS** – Food Safety and Inspection Service: an agency of the U.S. Department of Agriculture, responsible for ensuring that the nation's commercial supply of meat, poultry, and egg products is safe and correctly labeled and packaged.

**GLN** – Global Location Number: an identifier for locations and legal entities such as buyers, sellers, whole companies, subsidiaries, purchasing departments, nursing stations, hospital wings, loading docks, and warehouse gates, used as a reference key for retrieving information from databases and adding visibility to a supply chain.

**GTIN** – Global Trade Item Number: a globally unique code used to identify products, inner packs, cases and pallets, making a supply chain more visible, secure, and sustainable.

**IT** – Information Technology: anything concerned with using technology to treat information.

**KDE** – Key Data Element: data elements that comprise all of the information collected at each Critical Tracking Event. Key Data Elements should be universally agreed upon and followed by all supply chain companies, and include (but are not limited to) grower ID, harvest date, ship date, destination ID, case or pallet ID, and receipt date.

**PLU** – Price Look-up: an item without a barcode that therefore must be looked up by a cashier in order to be correctly entered during check-out.

**PTI** – Produce Traceability Initiative: a supply chain-wide electronic traceability program for produce designed to help the industry maximize the effectiveness of current traceback procedures, while developing a standardized industry approach to enhance the speed and efficiency of traceability systems in the future.

**SSCC** – Serial Shipping Container Code: a code used to identify logistics units, such as cases, cartons, pallets, or air cargo containers of trade items as they travel through shipping and receiving. When used in conjunction with electronic business transactions, the SSCC acts as a license plate, identifying the contents of the logistics unit.

IDENTIFY    CAPTURE    SHARE

**GS1 Standards for identifying, capturing, and sharing information— about products, trade items, business locations, and more—make it possible for companies to speak the same language and connect with each other.**

## ABOUT GS1

GS1 Standards for identifying, capturing, and sharing information—about products, trade items, business locations, and more—make it possible for companies to speak the same language and connect with each other.

The results of using GS1 Standards are visibility, efficiency, and security for business and convenience, value, safety, and satisfaction for consumers.

GS1 brings together stakeholders across an industry— from manufacturers and brand owners, to distributors and retailers, to industry associations and solution providers—for the purpose of developing, adopting, and implementing information standards that revolutionize the way they do business.

GS1 is a global, not-for-profit member organization with representation in over 110 countries.

GS1 US serves more than 250,000 businesses in 25 industries in the United States by facilitating industry initiatives, administrating the GS1 System of standards, providing education and support, and connecting communities through events and online forums.

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