Full Supply Chain Traceability Is the Future of Food Safety

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There are billions of dollars of untapped potential in the U.S. food supply chain. Entrenched issues such as supply and labor shortages, food waste, loss of consumer confidence, and erosion of brand value take a toll on narrow profit margins. Food safety issues are at the heart of many of these problems.

Despite advances in technology, detection methods, and our understanding of food safety risks, outbreaks and recalls continue to plague companies across the supply chain. One thing is clear: we need to do things differently. A major shift is occurring in the industry right now and converging market forces are driving disruption:

- Consumers are demanding greater transparency. They don't just want assurances that they are buying safe food – they're asking for visibility into the provenance and supply chain. In other words, they want to have confidence that proper handling, sustainability, and ethical business practices were used in the production and delivery of their food.

- The FDA finalized FSMA Rule 204 in November 2022. The finalized Rule is a major update to traceability requirements for the food industry.

- Technology is rapidly evolving in the food industry. We are now shifting to digitalized data capture with mobile devices and Internet of Things (IoT) devices, as well as advanced data modeling through artificial intelligence.

One thing is clear: the future of food safety lies in enhanced traceability. It is no longer enough to maintain simple one-up, one-back traceability records. To protect your brand and gain a competitive advantage, you need greater visibility and insights into your products.

iFoodDS has been actively contributing to the industry conversation on traceability, data standardization, and data sharing. There are three main themes that keep emerging:

1. Enhanced food safety through end-to-end traceability.
2. The benefits of adopting global data standards.
3. The need to shift from a reactive mindset to a proactive one.

Here, we explore these themes in detail and add our own thoughts to the conversation.

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Chapter 1: Enhanced Food Safety Through End-to-End Traceability

iFoodDS believes the future of food safety lies in end-to-end traceability. Currently, the siloed nature of the industry and lack of data sharing are preventing us from making meaningful progress on entrenched issues. But with FSMA Rule 204, the industry is headed towards end-to-end traceability that will allow us to follow an item's complete path through the supply chain and view associated food safety data. This is the best way to speed up recall response, protect consumers, and find the root cause of recurring issues.

iFoodDS' position on traceability is in line with many industry associations' views, including Western Growers, the California Leafy Greens Marketing Agreement, GS1, and the International Fresh Produce Association. Western Growers has directly tied traceability to food safety:

"Because of the complexity of the food supply chain, it is a challenge to accurately identify which particular food item is implicated in an outbreak. These situations can lead to economic damages and reputation issues hard to bear. What we don't often consider is how much time could be saved and how actions could be more accurate if everyone in the supply chain would adopt systems to trace products back and forward in the supply chain that allow easy data synchronization and enhanced communication. Besides the public health benefit, regulators and companies could also benefit from this: regulators by being able to take more timely/accurate actions and companies by being able to minimize reputation and economic impacts. … Traceability is important for food safety reasons!"[1]

iFoodDS concurs with this statement - traceability is imperative for better food safety. Beyond this obvious benefit, brands also gain these key advantages from end-to-end traceability:

- **Limit your exposure in recalls** by tracing down to the traceability lot code level. More advanced traceability platforms allow you to link lot code data across product transformations, from raw ingredients to a finished product, and view associated food safety data.
- **Gain a competitive advantage** by demonstrating adherence to best practices and verifying your product differentiators, such as sustainability, ethical sourcing, and organic certification.
- **Drive preference for your brand** by connecting your data to tell a meaningful brand story. Consumers want to feel confident in food safety, whether they're selecting a particular product, choosing which store to shop at, or visiting a restaurant. You can improve sales and revenue by leveraging transparency to gain consumer trust.

The Power of Connected Data

Karen Long, Vice President of Sales at iFoodDS, shared iFoodDS' vision of connected food safety, quality, and traceability at Food Safety Summit 2022. She described a future where we digitally collect food safety and quality data at every step of the supply chain, providing a full picture of a food item's history:

"When all of that information can be captured [digitally] … it creates [a] tremendous amount of force forward when we can link it all together with key data elements… [to] not only say where did it come from and where did it go to, but what happened to it where it came from and what happened to it after [it was sent up] the chain?"[2]

Karen also described how data visualizations, such as dashboards and reports, will help improve sourcing decisions for retailers, foodservice companies, and processors. Imagine if you could analyze your commodities or the individual ingredients of a product to gain insights into food safety and quality practices.

- This data would confirm you are sourcing the best product or guide you to better products in the future.
- You would be able to leverage historical data to identify quality trends by location, season, and supplier.
- This, in turn, would inform logistics and stocking methods to improve freshness and quality.
- Suppliers can then receive feedback on product quality that will help them meet buyer expectations consistently, improving their sales and revenue.

Our Vision for a Better Food Supply Chain

As we mentioned at the beginning of this eBook, there is vast untapped potential in the food supply chain. Imagine where the industry could be in the next decade if we start doing things differently. If we embrace digital data capture, we will be able to monitor food safety in real time and flag issues as they come up rather than reacting to an outbreak event. If this data is connected to a comprehensive traceability platform, we could quickly identify the affected products in the event of a foodborne illness outbreak. Companies could narrowly target recalls to just the affected lots, preventing unnecessary food waste. Consumer trust would be restored.

The industry must solve some significant challenges to make this a reality, but we may already have the tools to do it.

Chapter 2: What Is the Best Path Forward for Traceability?

The industry needs to overcome many obstacles to achieve full traceability across the supply chain:

1. Cost of adopting technology to enable traceability
2. Difficulties with technology implementation (e.g., disruptions to workflow and reduced efficiency)
3. Limited exchange of data between supply chain partners
4. Data privacy concerns
5. Lack of standardization

The FDA has made strides towards traceability standardization with FSMA Rule 204. This rule is ultimately a step towards enhanced food safety. By increasing digital record keeping, we will enable faster recall response. However, the FDA will not solve the industry's deepest issues, nor will any single industry player. Rather, it will take a collaborative effort by supply chain participants, technology companies, industry associations, and non-governmental organizations. The first step is overcoming siloes in the industry so we can enable meaningful data exchange.

The Importance of Adopting Data Standards

Our team recently spoke with Tom Sidebottom, regulatory consultant and former FDA San Francisco lab director. Sidebottom described his vision of a food supply chain where data is shared and analyzed to identify the root causes of issues as they arise. To address privacy concerns, data could be anonymized.[3]

Sidebottom finds the food industry's contract-based approach problematic for data sharing. He gave an example of duplicate assessments performed by a farmer and a third-party harvester. In many cases, assessment data is not shared between farmer and harvester, and therefore it lacks meaningful insights. This trend often continues throughout the supply chain. Sidebottom advocated for bringing this data together through industry standards. This doesn't mean standardization in which platforms or technologies we use, but rather, in terms of what information is collected. However, data exchange is limited without a common data format.[3]

Will GS1 Be the Standard the Industry Adopts?

FSMA Rule 204 is the catalyst for standardizing what data we collect. But how we share that data is still to be determined. GS1 has been at the forefront of developing traceability standards for the industry. Angela Fernandez, Vice President of Community Engagement for GS1 US, spoke with Food Safety Magazine about GS1 data standards and how they could become the standard the industry adopts to meet the FDA's New Era of Smarter Food Safety goals.

Fernandez pointed out that the New Era of Smarter Food Safety blueprint calls for the use of global data standards to help transmit product information across the supply chain. "It specifically cites GS1 as a standards body that can help harmonize the processes of industry and regulatory agencies, both here in the United States and internationally," she added.[4]

According to Fernandez, GS1 Standards are the most widely used supply chain standards in the world and enable both systems interoperability and supply chain visibility. This includes standardization of critical tracking events and key data elements. Products could be tracked more easily if the entire supply chain adopted a common language like GS1 standards.[4]

"Data that is created, collected and shared in a consistent manner helps all supply chain partners – from the farmer to the retailer or restaurant – see a product's journey, and continuously communicate key data elements during a recall or withdrawal," she emphasized. "'One up, one back' traceability is far too limiting to adequately protect consumers and is simply no longer good enough in the digitized 'new era.'"[4]

Fernandez acknowledged that not everyone has adopted GS1 standards at this time. “As standards are voluntary and flexible, there are varying degrees to which different industry sectors have leveraged GS1 Standards thus far. But one thing is clear – a common language for data increases the speed and accuracy of information being shared about products as they move in the supply chain. This speaks to the FDA’s mission to move to a food system capable of tracing potentially harmful products in minutes – not days or weeks – during a recall.”[4]

Notably, GS1 US participated in food traceability pilots with the FDA to inform Rule 204 and other rulemakings.[5]

In its comments on FSMA 204, GS1 noted that “a robust traceability system is more than just keeping specific records to help businesses and/or FDA manage product recalls. Traceability is about providing proper identification, visibility and sharing of information among supply chain customers and suppliers at all times to enhance accountability [and] food safety management and prevent food risks from arising…”[5]

iFoodDS is a long-standing member of GS1 and has been actively participating in GS1 traceability workgroup meetings. We believe that GS1 standards will be widely adopted throughout the industry. To clarify, this does not mean that every supply chain participant will use the same traceability technology or vendor. Rather, it means that most traceability vendors will support GS1 standards and use them to exchange information. We envision a future where traceability and food safety platforms are better able to communicate with each other.

Overcoming Obstacles to Collecting and Sharing Key Data Elements

One of the biggest concerns about Rule 204 is the operational burden of collecting and recording the required Critical Tracking Events (CTEs) and their corresponding Key Data Elements (KDEs). Distributors, retailers, and foodservice operators do not have an immediate solution to efficiently capture and store traceability data. As the industry navigates compliance with the final rule, we'd like to provide some ideas for collecting KDEs.

Get Shipping Information from Your Suppliers Electronically

First, ensure you are receiving all the shipping information from your suppliers – including their KDEs – electronically. Since the shipper KDEs correspond to the receiver KDEs, you'll need to make sure you're getting this vital information in a format that is easy to access and can be securely shared.

Here are a few different formats you could use:

- Ask your suppliers to export the data in a flat file (e.g., Excel or .csv) and send it to you using a secure file transfer service.
- Use an API to transfer information from your suppliers' ERP or traceability platform to your own system.
- Require Advance Ship Notices (ASNs) sent through EDI and ensure your ASN requirements cover all the KDEs you need to record.

Verify Physical Shipments

After you receive the electronic records, it's imperative to verify their accuracy. Your KDEs will be incorrect if an error occurs and your team fails to catch it. Ask your suppliers to put a GS1-128 barcode on every shipment. This will enable your team to scan the barcode and verify the physical cases match the electronic records the supplier sent over.

Work with a Partner to Enhance Your Traceability

Simply collecting and storing your data will limit its usefulness. Instead of viewing traceability as the cost of compliance, consider how you can leverage your data. The right business partner will increase your visibility into your suppliers' compliance, allow you to accept supplier KDEs in multiple ways, and enable you to quickly traceback and traceforward across your supply chain.

Currently, there is a lack of interoperability between ERPs, traceability platforms, and other digital systems. While it would be ideal to see widespread compatibility in the future, the food industry is far from this reality. This is where data standards could bridge the gap. All traceability vendors could ensure their systems recognize a common data standard, allowing their clients to share information freely.

Chapter 3: Moving from a Reactive Mindset to a Proactive One

We've covered traceability and how it can improve food safety processes. Now we'd like to take a step back and look at the bigger picture. **The ultimate purpose of traceability and connected food safety data is to shift the industry from a reactive mindset to a proactive one.**

Tim York, CEO of the California Leafy Greens Marketing Agreement, drew parallels between the airline industry and the fresh produce industry in an article for The Packer. York shared how the airline industry was able to virtually eliminate fatal crashes in the past decade after coming together to share vital safety data. He urged the food industry to follow this example.[6] We need to share our data to address the root causes of foodborne pathogen outbreaks. This will require a new mindset of mutual trust and a fundamental cultural shift.

Dr. Bob Whitaker, former Chief Science and Technology Officer of the Produce Marketing Association, has also discussed the importance of culture in the New Era of Smarter Food Safety. In a guest article on the iFoodDS blog, he advocated for building a culture of food safety in your organization.

Dr. Whitaker emphasized the role of a culture in driving operational improvements. Organizations need to use key food safety data to shape their culture. "I think the old adage is correct, if we can't measure food safety every day then we can't manage it," Dr. Whitaker wrote. "The corollary is that if a company cannot manage its food safety program, then it cannot possibly create a proactive food safety culture to protect its future and the customers and consumers it serves."[7]

Moving From Passing Audits to Managing Risks

If we want to truly shift to a proactive food safety mindset, we need to move beyond the goal of passing audits and start thinking about how we can better manage risk. Dr. Whitaker alluded to this in his guest post when he posed the question, “Why does food safety data usually sit in three ring binders on a shelf or exist in a database that is only used to demonstrate compliance with an externally derived food safety standard when an auditor visits?” He asserted that a risk-based food safety culture generates return on investment by reducing the likelihood of product recalls and illness outbreaks associated with a company’s products.[7]

Dr. Whitaker cautioned against substituting audits and industry standards for an authentic culture: “Sometimes companies are so preoccupied with navigating third-party audits and demonstrating compliance with regulatory and customer requirements that they assume they have a proactive food safety culture, when in fact they have a collection of external requirements that communicate compliance with somebody else’s view of what their food safety program should be.” [7]

The International Fresh Produce Association (IFPA) offered a similar perspective in its guide *The Building Blocks of a Food Safety Program:* “It is important to remember audits are only a measuring tool. Often, operators equate ‘passing an audit’ with a comprehensive food safety program.” However, a truly comprehensive food safety program “is composed of many foundational programs, with risk assessment as a central theme, to address the risk profile of your specific operation. An audit is a toll that permits you and your customers to assess your adherence to your program.”[8]

IFPA puts emphasis on training your team and validating that they understand how to perform their food safety tasks, just as you would validate any other process. iFoodDS concurs with these statements. Risk assessment is the key concept here. Proactive food safety is all about managing risk rather than checking off tasks. To do this, you need to invest in the right staff and training. It’s also important to have the proper equipment and food safety processes. In other words, you must build the proper foundation before you can unlock the full potential of digital food safety data.

Predictive Analytics

Now consider the bigger implications of digitized data. You could gain insights from that data to predict a food safety issue before it occurs, and then put preventative measures in place. Predictive analytics has long been an area of interest for many in the food industry. We are still in the early stages of artificial intelligence and similar tools, but iFoodDS is excited to see how the industry will evolve as these tools are fine-tuned.

One especially promising area is agent-based modeling. This type of model recreates an employee population at an individual level in a computer program, and then simulates employee behavior and interactions over time to gain insights into future dynamics. This helps predict outcomes such as the spread of disease among workers, foodborne pathogen spread, or production value over time.

To bring the discussion back to traceability, remember that this digital food safety data is limited to your own link in the supply chain unless you can find a way to exchange data with your partners. This limits the scope of your risk assessment. How can you fully understand the threats if you can't see an item's complete history? Sharable electronic documentation is at the heart of an effective food safety program. If we want to evolve our food safety practices, we need to embrace real-time visibility across the supply chain.

Chapter 4: Cutting Through the Complexity of the Supply Chain for the Benefit of the Consumer

Ultimately, the consumer is the beneficiary of increased food safety. The food industry has a unique priority above profits and organizational growth – we are responsible for feeding the world. Our highest mission is to provide access to safe, fresh, high-quality food.

iFoodDS envisions a future where food safety data is integrated across the supply chain, providing transparency and advancing industry knowledge. When we connect the data points, we will tell a meaningful narrative that empowers participants across the supply chain to overcome the deepest food safety issues and feed the global population.

Increased transparency will also provide a competitive advantage. For example, companies could prove their claims of organic, non-GMO, all-natural ingredients, and various other marketing statements. They could demonstrate that workers were treated ethically at every step of the supply chain and the product was produced sustainably. And in the event of a foodborne illness outbreak, their food safety data would show their product was not affected. These unique features could be leveraged to gain buyer preference over competitors and generate demand among consumers.

By implementing full supply chain traceability and connecting it to food safety and quality data, companies can:

- Demonstrate their value to buyers
- Differentiate their brand from the competition
- Tell their story more effectively

What could your company do with these capabilities? Where would this take your business next?

iFoodDS is on the front lines of this effort as a supply chain solution provider. Our offerings include a digital traceability solution integrated with food safety and quality software. We encourage you to reach out to us and start a conversation about your own goals, needs, and vision for your organization.

Email sales@ifoodds.com or visit our website to learn more about our digital food safety, quality, and traceability solutions.

This material is for informational purposes only and not for the purpose of providing legal advice. You should contact your attorney to obtain advice with respect to any particular issue or problem.

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