Building Traceability in Foodservice Supply Chains: Insights from the Leaders

NATIONAL RESTAURANT ASSOCIATION | SUPPLY CHAIN MANAGEMENT Executive Study Group | Neeley TCU SCHOOL OF BUSINESS

Center for Supply Chain Innovation

Building Traceability in Foodservice Supply Chains: Insights from the Leaders

A research study conducted by the NRA Supply Chain Management Executive Study Group[1]

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[1] Learn more about the SCM executive study group at http://www.neeley.tcu.edu/SCMESG/About_us/#committee

Foodservice Traceability: Compliance or Capability?

Over the past decade, the focus on traceability in the foodservice industry has become increasingly acute due to a combination of factors, including:

- Food safety failures at several highly visible foodservice chains,
- Passage of the food safety modernization act in 2011,
- Rising consumer expectations, and
- Continued growth of technologies that enable more standardized data, more precise data acquisition, and more connected data networks.

While both the pressure for, and capabilities of, traceability systems seem to be rising, there remains a strong divergence in supply chain management executives' views of the importance and role of traceability in the business success of foodservice chain operators. While a few operators are pushing the envelope of capability and seeing traceability as a competitive differentiator, others are slow to adopt industrywide standards, and expect a more limited scope of benefits from traceability investments.

This report provides insights from discussions with leaders representing this spectrum of traceability strategies (see sidebar on the study details). We present a deeper dive into the dynamics surrounding a firm's traceability efforts, with the following objectives:

- identify state-of-the-art capability for traceability in the industry,
- further examine the expected and realized benefits of traceability,
- identify necessary steps, drivers, and challenges for growing traceability capability, and
- establish some "best practices" in traceability implementation

A Study of Foodservice Traceability

As part of a partnership with the National Restaurant Association's (NRA's) Supply Chain Management Executive Study Group, (SCMESG), researchers from the Center for Supply Chain Innovation (CSI) at TCU have been conducting a series of studies focused on product traceability. An initial white paper, published at SupplyChainScene.org, provides a perspective on definitions, use, and building a business case for traceability. Also at the site, interested readers can find results from a survey of more than 100 foodservice operators. The survey examines levels of traceability capability, as well as usage of traceability platforms and tools. The results give a snapshot of the current state of the foodservice industry, and provides the opportunity for firms to benchmark their traceability capability.

Building upon these initial studies, we conducted structured interviews with executives from five foodservice operators and two distributors during the fall, 2017. All firms are large players in the quick service restaurant (QSR) and casual dining segments of the industry. We are grateful to the participants for sharing both their time and expertise with us.

Current State of Traceability Capability in Food Service

Traceability defined

For the purposes of this study, we used the following definition:

> *Traceability is the ability of foodservice partners to quickly verify the history, location, and usage of product, resulting from coordinated efforts of trading partners to collect and maintain product information that supports batch/lot or serial number visibility of the product's movement through the distribution channel.*

When asked "What does traceability mean to you?" the executives we interviewed made statements largely consistent with this overall definition. In terms of the desired scope of traceability, a phrase that stood out from the interviews was "farm-to-fork," meaning the ability to know the current and past specific locations of a product in the supply chain at any given time. This includes movement from suppliers to distributors, distributors to restaurants, and any movement that takes place between distributor locations or restaurant locations.

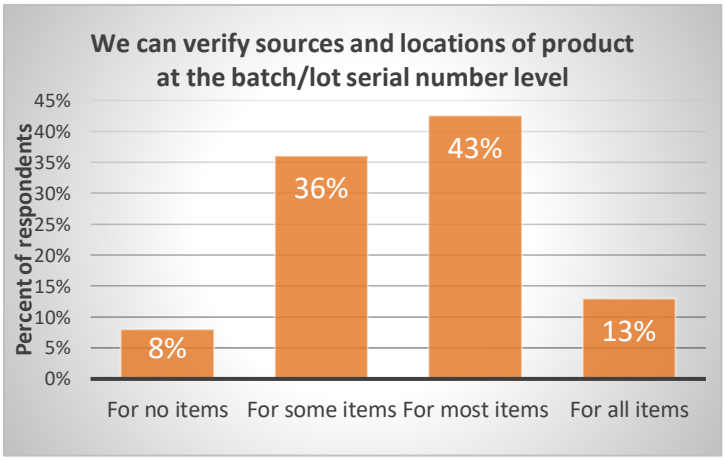
While there was agreement regarding overall traceability concepts, our interviews uncovered a wide disparity in the motivations, goals, and levels of effort various operators and partners are giving to traceability. These differences are reflected in the ways that operators are defining traceability capabilities and metrics.

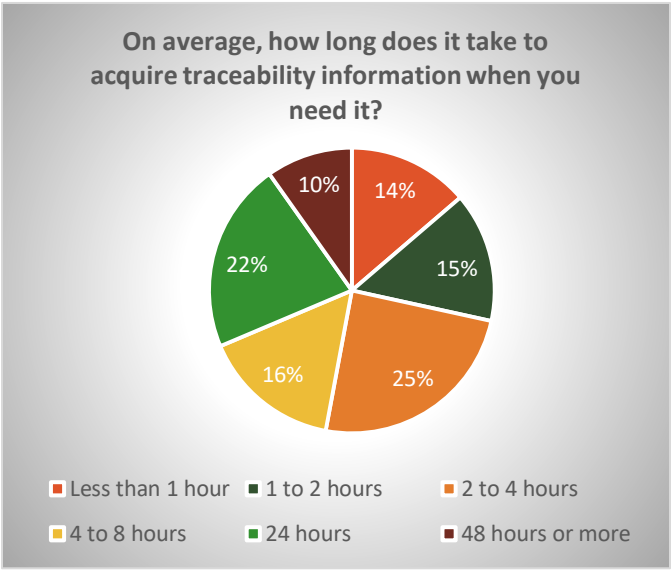
Establishing levels of traceability capability

Regarding *farm-to-fork* traceability, all of the interviewees indicated that they still had a long way to go to create the comprehensive visibility that they wanted. Only one operator reported that traceability from suppliers to distributors to restaurants was fairly comprehensive and complete. This particular operator had managed its own distribution system for decades in the past, and has been able to preserve that visibility even after outsourcing its system.

Despite this observation, concluding that traceability is low for all other operators is not entirely accurate. For a given company, complete visibility and traceability may not be the goal for more than a small subset of critical products. Thus, the fact that managers and planners cannot trace a large percentage of SKU's does not necessarily indicate a shortcoming. Accordingly, the *scope* of traceability is an important consideration in assessing capability.

Our survey of 101 food service operators provides a more comprehensive picture of traceability capabilities. More than 50% of respondents indicated that they can verify sources and locations of product at batch/lot serial number levels for most or all items in their supply chains. However, many of the processes used to generate this information are still manual, involving phone calls, manual record searches, and similar efforts.





Hence, when gauging traceability capability, it is important to also consider the *speed* with which traceability information can be developed. Our same survey shows a wide variability in the time needed to acquire information. While 50% of responding operators can get track and trace information in 4 hours or less on average, more than 30% of respondent require one to two days, or more.

In addition, the *precision* with which location and source information can be obtained varies widely across operators' supply chains. The operators we interviewed stated that they could identify shipments from distributors pretty easily using automated tools. However, identifying precise locations in restaurants remains the weakest link in the visibility chain for many items. For example, recall actions are often executed globally, even though food safety or quality issues may pertain only to certain batches distributed to a few specific locations in operators' networks.

To truly get at some benchmark measures for traceability, one leading operator suggested the following questions to provide differentiating insights:

1. What percentage of items have GS1 128 (or similar) barcodes with lot code and date data?
2. What percentage of products are scanned in to restaurants/stores?
3. For what percent of the operator's system (% SKUs, % locations) does this occur?

In response to these questions, we received a wide range of answers. One operator reported, for example, that the percentage of *proprietary items* with GS1 128 barcodes containing detailed information is around 80%, but the percentage is much lower for other items.

Scanning into restaurants is one of the important current frontiers of traceability capability. Only one of the operators we interviewed said that its company currently scanned at this level, and only about 4% of product. However, the operator indicated that the company was working hard to have 40% of its distribution system scanning cases in to restaurants by early 2018 via a specialty app that store managers can download to their smartphones. Other operators reported that they expected significant progress in this area within the next two years, particularly as suppliers and distributors make necessary investments to improve their capabilities.

Scanning into restaurants is an important current frontier of traceability capability. Few operators have the capability today, but leaders are moving in this direction.

Both of the distributors we spoke with have leading edge capabilities. They scan GS1 128 barcodes for cases as they are picked in the warehouse, and scan serialized bar codes for some items at stores as they're delivered. Which cases are scanned at delivery depends on the operators; they tell distributors which items they want tracked. The distributors then scan the serialized codes, sending operators the information.

On the inbound side, there is some variation between the distributors. One of the firms scans GS1 128 barcodes at receipt of the product, either at the pallet or case level, depending on what is available. The other said that the firm has the capacity to do inbound scanning, but is not currently doing so due to the fact that most pallets do not have ASNs, therefore requiring manual entry of lot codes and dates. Scanning some but manually entering others would create two different processes on the floor, creating an inefficient operation. This particular firm indicates that the company will start scanning inbound when closer to 70% or more of its suppliers are using them.

Some operators have as many as 60% of their items tagged with GS1 128 codes, for others it's as low as 1 or 2% - it depends heavily on the concept and the type of item.

Challenges in assessing capability

Respondents were clear that true capability is difficult to assess in a comparable way. Much of the difficulty centers on compliance issues, primarily with suppliers. For example, a given supplier might attach barcodes as required, but:

- Print quality might be bad, preventing it from being read by scanners.
- Bar code might not have all the correct attributes, or isn't a GS1 128 barcode.
- Discrepancies can exist between the volume and weight listed by the supplier for the item and the actual measurements.
- Suppliers often have multiple manufacturing facilities, so they might be compliant in one location, but not in another.

Another issue on the supplier side is compliance with low-volume or specialty items. One operator noted that not all of its stores offer a breakfast menu. As a result, it can be difficult to get suppliers to comply when their purchase volumes for these items are relatively low.

Operators also discussed issues on the distribution side that affect the ability to assess their level of traceability. Not all distributors are scanning GS1 128 barcodes on both inbound and outbound cases. One operator stated that the company has 8 distributors and 23 distribution points. While 50% of them scan inbound, only one of the distributors does scanning outbound.Another operator reported that outbound scans were in the 2 to 3% of products range.

Why Invest in Traceability?

All of the operators said that their primary motivation for improving traceability capabilities was to enhance food safety in order to protect consumers, while also protecting their brand in the event of a recall. Other stated motivations were "consumers are expecting it," or "it's the right thing to do." However, as stated earlier, there are noticeable differences in levels of importance and effort that operators give to traceability initiatives. None of the operators we spoke with have yet formalized a hard Return on Investment on their traceability efforts. In most cases, the genesis for new or renewed interest in traceability has originated with a risk mitigation mind-set, based in food safety and quality functions of the organization. One executive voiced a typical view of traceability saying, "Investing in traceability is like buying insurance – it's something you have to do to stay in this industry."

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One operator provided a notable exception in which traceability efforts have evolved more from top management directives. This operator envisions a larger set of traceability benefits including those identified below.

In contrast to operators' perspectives, the distributors we interviewed tend to view their traceability efforts more strategically, as a way to win or keep business. One distributor cited owner's/founder's belief that technology makes the business more efficient, and making jobs easier for employees. Both distributors we interviewed have staked out leadership positions in the industry by having representatives at the first GS1 meeting and by continued involvement with GS1 boards and initiatives.

Product withdrawals

Traceability allows, or has the potential to allow after further implementation, for precisely focused recalls in the event of a contamination issue, or "a small vs. large net."

- Increases speed at which bad product can be removed from the supply chain
- Minimizes time spent collecting product
- Minimizes waste associated with unnecessary removal of good product
- Eliminates unnecessary communication with unaffected distributors and restaurants
- Offers protection to brand image

Other benefits[2]

Beyond the potential for withdrawal efficiency, there is a significant degree of variance in thoughts and experiences. Many companies stated that they were able to, or saw potential to, gain valuable operational insights from the data collected as part of traceability efforts.

- Allows planners to know demand numbers for forecasting planning.
- Prevents stock-outs by increasing inventory level visibility. This is especially beneficial with Limited Time Offer (LTO, products, for which there is a short sales window and operators spend heavily on marketing.
- Strengthens yield management by giving insight to where a store might be using too much of a limited ingredient, helping managers initiate control efforts.
- Identifies reoccurring quality issues highlighting if there is an underlying cause, (e.g. all goods originated from same farm).
- Addresses internal problems with shrink and inventory loss data.

One operator was able to show savings of $1.3 million per year through improved truckload optimization and materials handling related to its traceability efforts – and this was for just one supplier to distributor route. This came about as the operator compared product weight/dimension records between its system and that of its suppliers and distributors. The operator discovered that as many as 82% of product records were inaccurate. Correcting these discrepancies facilitated greater efficiency in shipping.

While operators mentioned reductions in mispicks taking place at the distributor and deliveries of incorrect cases to restaurants, another operator did not seem to see benefits beyond the potential to protect the brand in the event of a recall. When asked specifically about improvements in product weight/dimension accuracy and in order pick accuracy, this operator argued that enough scanning already goes on in distribution to adequately address mispicks.

[2] Our earlier white paper provides a ROI template and wider discussion of traceability benefits. Find the paper, "Traceability in Food Service: The Opportunity and the Challenge," at http://www.neeley.tcu.edu/SCMESG/Research/

Challenges in Building Traceability

Costly investments

In addition to significant time and effort, traceability improvements likely will require investments in hardware, systems, and people, particularly at the supplier and distributor levels.

- Operators often must hire personnel dedicated to their traceability efforts. One leading operator has dedicated three full-time employees to traceability. Their roles involve setting standards and targets, implementing process and technology changes, managing and analyzing related data, and engaging in outreach to supply chain partners. (e.g., communicating the goals and benefits of traceability).
- Another investment for operators is data management systems. Some operators try to do this themselves, others hire a third part company to manage a shared (cloud-based) system.
- Distributors' investments in hardware and data systems can be substantial. One distributor suggested that the cost to obtain the level of capability many operators are requesting would be around $5 million dollars
- While most larger suppliers have label printing capabilities, smaller players must purchase GS1 128 barcode label printers, as well as establishing data bases containing product information.

The chicken and the egg

A related obstacle is the "*chicken and egg"* problem. Distributors might say they don't want to invest in scanning technology because they have nothing to scan, while suppliers say they don't want to invest in barcode printers because nobody is scanning them.

Motivation

Incentives and needed capabilities are not well aligned. Distributors may perceive that a product recall, while an inconvenience, is not a strategic threat to them like it is to an operator or supplier. Further, they can usually charge the supplier for any cost incurred executing a product withdrawal. One operator shared an example of a distributor that refused to make traceability investments, stating that the only way the distributor would move forward is if traceability became mandated by the government.

Legacy systems

Even when partners are committed, an important challenge is to collect and disseminate data through legacy warehouse management systems. "Some distributors are very behind the times," said one operator. Systems that may be adequate for managing internal operations often do not work as well for information sharing, and cannot be easily altered to adjust to a new data collection standard. Specifically, these systems lack capabilities to collect and share data so that the data can be linked to scans taking place at suppliers or in restaurants.

Blurred lines

Taking proper care of the inkjet printers used to create labels is critical. While seemingly a a simple problem to fix, several operators and distributors noted that smudged and damaged bar codes cause significant scanning headaches at suppliers and when cases are picked in warehouses.

Priorities

More immediate challenges often hamper traceability efforts. For example, one operator noted that finding truck drivers and improving delivery reliability are top challenges. He described traceability as "a nice goal," but just getting trucks to restaurants is a more critical challenge.

Employee turnover

Employees must be convinced that traceability procedures are important, and must also be trained in how to carry them out faithfully. Continually training replacement workers can be costly and disruptive. With industry turnover rates at record levels, one respondent suggested that 100% traceability will likely never be reached.

Overcoming Obstacles: Success Factors and Best Practices for Implementation

Commitment and collaboration

First and foremost, success in building traceability depends on having committed leadership in the organization and in the leadership of supply chain partners. "Traceability is not a competitive space, it's a collaborative space. Everyone must participate for it to work," stated one operator. Other operators we interviewed were unanimous in asserting that traceability requires all of their trading partners (suppliers, operators, and distributors) to work together.

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Communication

Commitment to traceability needs to be communicated, both internally and externally with partners. Everyone, from the top down to the newest hire on the warehouse floor, must understand the value of traceability efforts, as well as their role in making it happen. Additionally, operators should communicate the financial and operational benefits of traceability to their supply chain partners. Having a calculated ROI figure to show, and illustrating how your partners can similarly benefit, can be critical to gaining buy-in.

Benchmarking and goal setting

External communication also involves assessing the capabilities of partners, discussing expectations, and establishing goals. One operator conducted a survey of suppliers' capabilities and used the results to set growth goals for different tiers. "Stick to what you're asking for from SC partners, and don't keep making changes to requirements," stated one respondent.

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Standardizing requirements

Most operators share distributors and suppliers, and when each operator has unique requirements for information contained in bar codes, it significantly increases the cost and difficulty of compliance. "Stop thinking about the way you've been doing things for the last 30 years," advised an executive at one operator. He suggested that operators need to look beyond their own business and work collectively,doing what's best for the supply chain, and being flexible regarding formats, standards, and requirements.

Data management

More than one operator acknowledged the significant cost and challenge of managing the vast amount of data collected by their distributors as part of traceability processes. They acknowledged it was unfair to expect distributors to take on all the costs and requirements of data management. As a result, operators need to develop the capability to manage transmitted data in-house, or find a capable third-party provider to do the job.

Technology

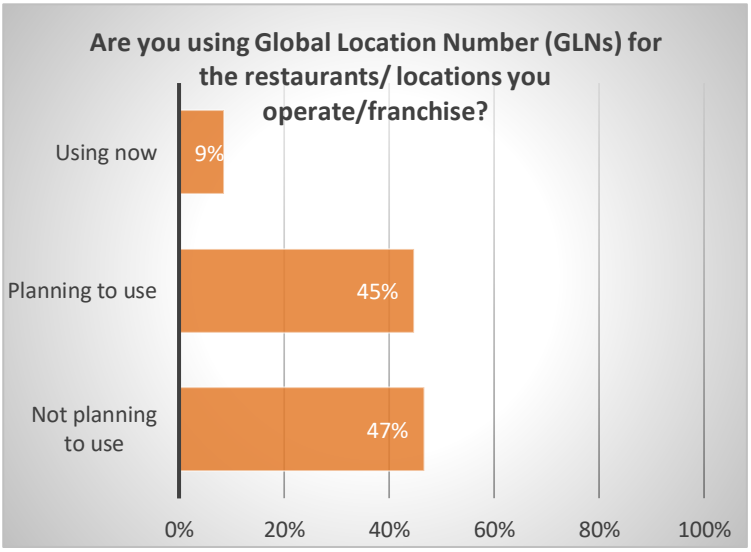
Technological advances such as hip-mounted printers in the warehouse and optical scanners (as opposed to laser scanners) for delivery drivers are making scanning easier and more reliable. One distributor recently transitioned from Motorola laser scanner guns to Android image readers. While expensive, the delivery drivers love the new scanners, as they operate much faster and are more forgiving in reading damaged bar codes. The new scanners also provide an image of the delivered case in addition to the bar code scan, providing further validation of product whereabouts in the event of a recall incident.

GS1 engagement

Several of the operators we spoke with highlighted the value of engagement with the GS1 community, and specifically the work groups at NRA and GS1 conferences. "This greatly accelerates learning," reported one operator. "You can see what peers are doing and keep up, but also learn best practices - what's working and not working. This helps with development of a road map and is the chief enabler of success." Another executive stressed, "Stick close to GS1 guidelines so that SC partners can jump onboard with little hassle. Everyone needs to speak the same language to make this work."

Global location numbers (GLNs)

Establishing GLNs at store locations is an important way to extend the benefits of traceability and enhanced visibility. GLNs force drivers to scan all restaurant deliveries, cutting down on errors and ensuring that a location record exists in the field for a given case. Typically, a driver scans the GLN code at the back of store to unlock the scanner gun, and then has 30 seconds to scan everything on a hand cart. The process is repeated until all cases are delivered. If the driver attempts to deliver an incorrect case, the scanner issues an alert. Similarly, an alert is given if not all cases scheduled for delivery are provided.



One distributor emphasized that this has been the most beneficial element of the traceability process. Our survey results indicate that store-level GLNs is a differentiator, as fewer than 10% of respondents currently have this capability.

Compliance audits

It is important to verify periodically that supplier bar codes contain correct and complete product information. For example, one operator regularly selects a sample of 20-30 products, asking distributor partners to send product dimensions, weights, and case pictures. These data are compared against product records, assessing attributes such as:

- Does the GTIN match what is in the vendor contract?
- Do measurements (e.g., cube, weight) match what is in the contract?
- Does the GTIN have a batch lot, production date, or a use by or harvest date, (depending on product category)?
- Is the barcode image scannable?

The information gathered from these audits can be used to generate supplier scorecards and to facilitate traceability conversations between operators and suppliers. In this process, distributors are responsible for scanning products, yet they are reliant on operators to demand good bar codes from suppliers and to apply pressure to correct any issues. One related best practice recommendation by distributors is that operators insist that suppliers get their bar codes rated through an accredited bar code agency.

Suppliers need to get their bar codes rated through an accredited bar code agency.

Celebrate wins

It's important to celebrate wins along the way. One operator emphasized that traceability is a continuing journey, and significant improvements don't happen overnight. It's important to quantify benefits along the way both internally and for all members of the supply chain. This is a significant factor in motivating participation.

Looking to the future

The leading operators that we interviewed expressed optimism in their desires to achieve greater levels of traceability and, more broadly, *visibility,* both across their supply chains, and within their restaurants in the coming years. Technological evolutions and innovations including optical scanning, smart-phone based imaging, geo-stamping, RFID, and, in the longer term, network solutions such as blockchain[3] technology offer ways to continually improve efficiencies and reliabilities in data capture, structuring, and sharing. Evaluating and strategically exploiting these technology solutions will require a lot of work. However, our discussions with the leaders strongly suggest that technological hurdles are not likely to be the limiting factors in achieving desired levels of traceability in the food service industry. Importantly, it is organizational and economic factors that create the biggest challenges to reaching next level capabilities.

There are important misalignments in perceived benefits and required investments for traceability up and down food service supply chains. Suppliers and distributors perceive that they bear most of the costs of investments required to mitigate risks, mostly on the behalf of operators. For many of them (as well as for some operators), traceability is seen as a *compliance* issue, rather than as a *capability* that yields valuable returns. As regulators and customers become increasingly more demanding of prevention and proactive responses to food safety issues, these issues will likely work themselves out. In the meantime, it will be important for leaders in the industry to make more compelling arguments and develop even more concrete ROI projections to get the partner commitments so necessary to establish a fully functioning, comprehensive traceability system. Contributions to ROI need to consider benefits that go beyond recall efficiencies, including:

- Product quality optimization from precise supplier data on yields and quality attributes
- Brand elevation by providing consumers with detailed information on food sources
- Inventory, shelf-life and in-store operational optimization
- Improved product weight and size data, order accuracy, invoicing, and other accuracies

Along with securing commitment to traceability as a strategic initiative (not just risk mitigation), taking a broader view of the potential gains to be had (and shared) from improved visibility is an important first step toward building a compelling business case for investments in traceability.

[3] To learn more about blockchain technology, see related videos at http://www.neeley.tcu.edu/SCMESG/Media/