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eBook

# The Importance of Traceability in Manufacturing and Industrial Applications

Simplified Production. Sophisticated Delivery. Item-Level Visibility.

# The Evolution of Traceability in the Industrial Supply Chain

Traceability is the function of accurately tracking products and materials throughout the supply chain. Today, industrial manufacturers increasingly rely on advanced traceability solutions to monitor production, ensure quality control, track shipments, and remain compliant in a volatile market.

Traceability has certainly come a long way. Traditional traceability methods progressed from mere manual record-keeping to the universal product code (barcodes) in the 1970s.

The tools that breathe life into the manufacturing industry now involve automation, wireless sensors, machine learning, and advanced software. These changes in traceability lead to:

- Mitigated waste
- Lower production costs
- Decrease production and delivery times
- Data transparency

Modern use of automated RFID technology and IoT (Internet of Things) continues to outperform traditional scanners and tracking systems, providing real-time insights from production to delivery. Such insights give companies the level of control their value chain demands.

## RFID Technology in Manufacturing and the Supply Chain

When radio-frequency identification (RFID) became a supply chain innovation in the early 2000s, it seemed like a global solution. But it had its shortcomings. Many companies couldn't afford it, its abilities were limited, and it failed to deliver real-time visibility.

As monitoring software advanced, so did GPS technology, cellular locators, and sensors. This resulted in significant improvements for those using RFID tags in the supply chain.

Today, radio-frequency identification (RFID) is integral to global manufacturing traceability. These small, wireless devices have big, positive impacts on everything from production tracking, WIP tracking, equipment management, and reordering/restocking in manufacturing applications. Already widely adopted by global companies, RFID is expected to grow by more than 10% CAGR in the industrial sector by 2027.

To be effective, RFID devices need to be paired with interoperable tech—which is why the Internet of Things is so groundbreaking. When combined, RFID and IoT tools secure holistic supply chain traceability.

## IoT Solutions for Traceability Advancement

The Internet of Things (IoT) enables wireless communication between interconnected devices and databases. IoT technologies allow handlers in the supply chain to gain up-to-speed information, giving manufacturers a close look at the location, condition, and status of each product.

Common types of IoT in manufacturing and industrial applications include:

**Sensors—**for tracking geolocation, motion, temperature, humidity, optics, and other biometrics.

**Cellular networks—**for affordable, reliable data transfer across large ranges.

The use of compatible, connected IoT solutions continues to improve traceability with accuracy, benefiting industrial manufacturers that transfer specialized items across the globe.

## AI in Manufacturing Traceability

AI is one of the most recent innovations in traceability systems, offering predictive inventory insights, maintenance suggestions, production planning frameworks, and more. Some manufacturing companies, for example, augment their workflows with AI tools such as collaborative robots ("cobots") to give workers an extra set of hands. Others benefit from machine learning algorithms to calculate product demand fluctuations throughout the year.

Predictive AI features alone can decrease management errors significantly, reducing inventory shortages and profit loss by 20%, according to McKinsey. Additionally, AI and machine learning tools increase efficiency and operation by minimizing the need for employees to complete repetitive, physically demanding tasks—sometimes automating up to 50% of supply chain management activity.

## The Future of Manufacturing and Industrial Traceability

Track and trace solutions are no longer about delivery alone. Traceability is crucial during the entire production cycle, from facility inventory to final destination.

For this level of visibility, manufacturing companies need advanced solutions that are:

- Scalable
- Flexible
- Smart
- Secure

With real-time, item-level visibility Track & Trace software from BarTender, manufacturing companies can continue to adapt alongside the evolving value chain.

Gain unprecedented insights and inventory control with Bartender Track & Trace

BarTender Track & Trace™

# 5 Key Drivers of Advanced Traceability Adoption

Real-time traceability in manufacturing and industrial applications fulfills five main goals:

1. Efficiency
2. Compliance
3. Quality Control
4. Risk Mitigation
5. Sustainability

# 1 Efficiency

One of the major benefits of advanced traceability in the manufacturing value chain is efficiency. Monitoring operations with total visibility allows managers to identify bottlenecks and inefficiencies before they become major issues.

## Advanced traceability systems enable manufacturing companies to:

| | |
|---|---|
| **Accurately manage inventory** | Ensuring stock levels remain stable and preventing waste. |
| **Maintain equipment** | Detecting potential malfunctions early and enabling predictive maintenance via IoT trackers. |
| **Reduce labor costs** | Offloading employees' physical strain by implementing automation and mechanical production tasks. |
| **Prevent downtime & disruption** | Protecting against workflow issues with data from a 360-degree view of production. |
| **Minimize product errors** | Identifying defects and inaccuracies early to prevent recalls and wasted materials. |

## 2 Compliance

For many industries—advanced manufacturing included—strict regulations are emerging and causing companies to refocus their efforts on security and environmental sustainability. Compliance is non-negotiable. Companies need more oversight to meet these demands, safeguard their processes, and protect their products every day.

Integrated traceability methods that use RFID, IoT, and proprietary software ensure compliance throughout the supply chain. Manual tracking—including barcode scanning—isn't effective, especially for complex production systems.

## 3 Quality Control

Real-time item-level visibility provides insights into production setbacks and potential weak points. It identifies problems early in the manufacturing cycle, delivering data that inform necessary improvements through production cycles. This results in reduced costs, more detailed analytics, and less room for human error.

## 4 Risk Mitigation

End-to-end traceability is vital to mitigating serious risks at every phase of the supply chain. Fraud, product recalls, theft, and employee health risks can go overlooked when there's a lack of visibility, causing undue financial and company-wide stress.

## 5 Sustainability

Supply chains and sustainability have an intricate relationship, contributing largely to the future of industries worldwide. Logistically, supply chain operations account for an average of 90% of a corporation's carbon footprint. This is an invitation for action to companies working to improve their ESG (environmental, social, and governance) efforts.

Of 525 large companies surveyed by EY in 2022, the top motivators for adopting supply chain sustainability were reported:


The same survey from EY also found that while traceability is a top priority for supply chain sustainability, only 10% of companies have adopted solutions that enable end-to-end visibility. From vetting stakeholders to viewing transportation data, adopting total visibility is a must—and companies need the right technology to make it possible.

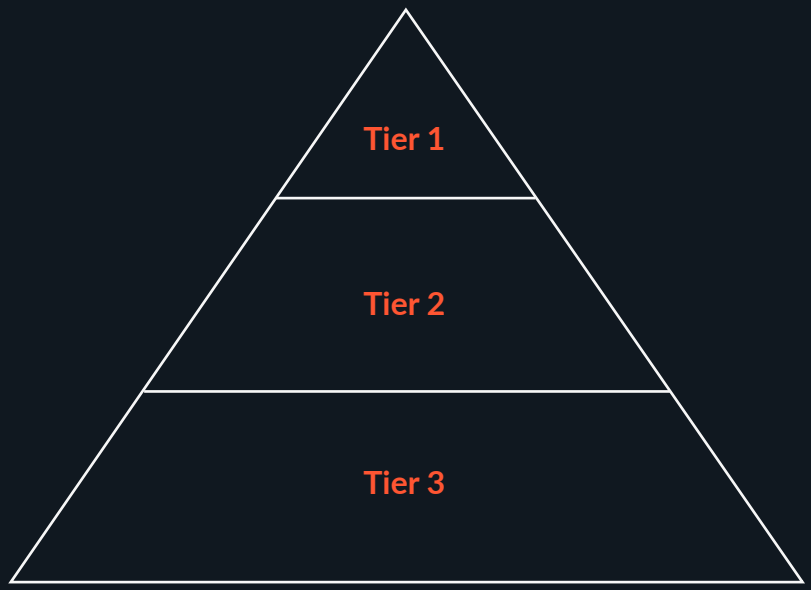
# Overcoming Challenges in the Industrial Supply Chain

Many essential functions in society—from the transportation we rely on to grocery stores we buy from—rest on the foundation of the industrial supply chain. Addressing existing challenges in this space is crucial not only for manufacturers but also for the population.

Advanced traceability providers like BarTender aim to resolve the following challenges.

### Limited Visibility → Lack of Insights

In a survey from Deloitte and the Chartered Institute of Procurement & Supply, three main tiers of supply chain visibility are defined. In manufacturing, supplies used during production may fall under these categories.



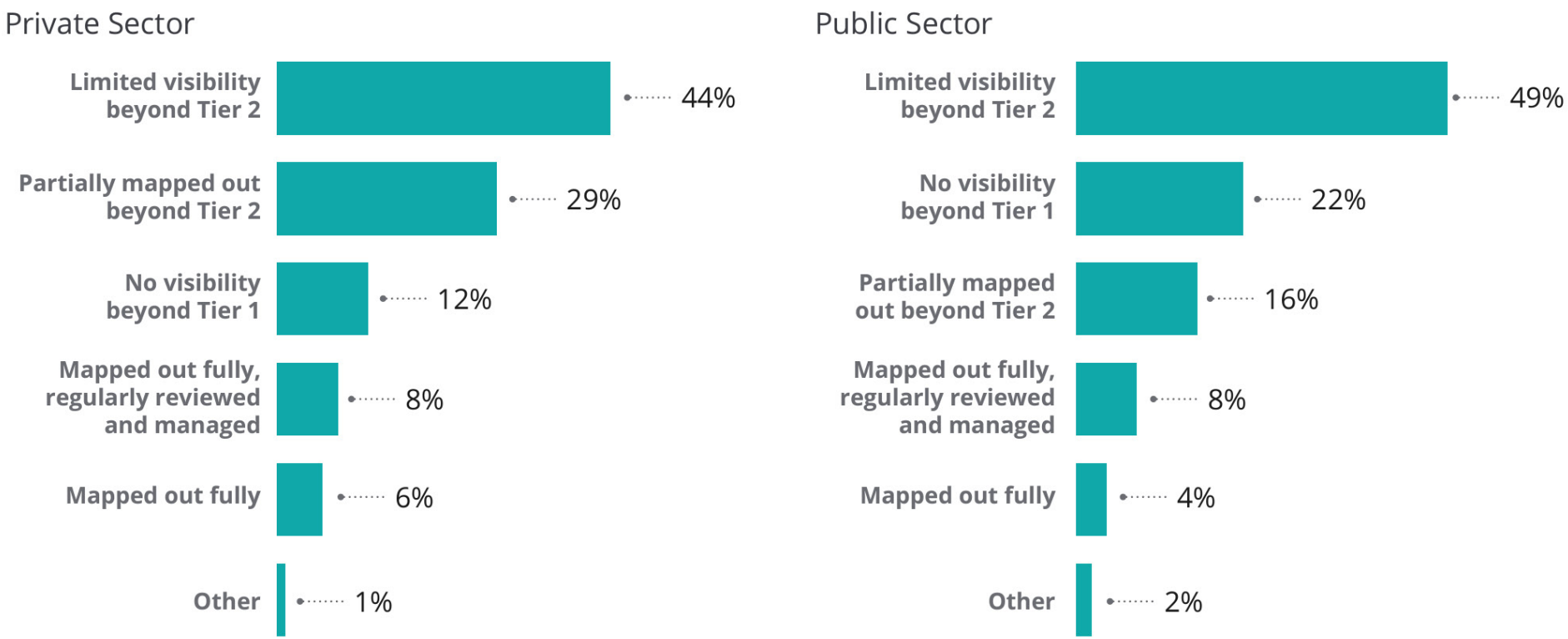

**Tier 1:** Supplies sold directly to companies

**Tier 2:** Goods and services obtained to produce supplies

**Tier 3:** Raw materials sourced to create the goods and services used by suppliers

Only 8% of supplier networks have full visibility across all three tiers. Those with limited traceability past Tier 1 risk negative outcomes such as product loss, fraud, and recalls, as many supply chain disturbances occur in the first two tiers.

# Private and Public Sector Supply Chain Network Visibility




*Source: Deloitte*

## Manual Processes = More Room for Error

Manual processes are still everyday realities in industrial operations. While there will always be value in procedures that require human interaction, creativity, and reasoning, many time-consuming tasks in manufacturing can be automated for greater efficiency.

Imagine automating all the processes that leave less room for error:

- Inventory counts
- Packing
- Picking
- Generating documents
- Processing orders
- Paying invoices
- Printing labels
- Scanning barcodes
- Notifying suppliers and partners
- Troubleshooting equipment
- Generating track-and-trace reports

There are smarter options available. BarTender Track & Trace supply chain software automates these routine, accident-prone tasks, saving your business time and money.

## Increased Fraud and Counterfeit Parts

Counterfeit items are a serious threat to suppliers and consumers. From vehicle airbags to baby carriers to medical devices, substandard materials are simply not an option if manufacturers are to maintain trust with buyers.

Fraud is another growing concern across industries. Fragile traceability between merchants and manufacturers increases the risk of compromised shipments, fake invoices, and other forms of theft.

End-to-end visibility is a vital prevention strategy against bad actors in the manufacturing lifecycle.

## Difficult Recall Resolution

Product recalls reached startling numbers in 2023, resulting in the highest number of recall events since 2011. Every recall comes with associated risks, including significant financial loss, litigation, consumer safety concerns, and reputation damage.

Locating the source of a product defect is the most effective way to prevent recalls. With advanced traceability beginning at the manufacturer's facility, companies can quickly isolate issues that lead to recalls thanks to timely data collection and tracking. Additionally, this valuable data can be used to prevent similar incidents from occurring again.

## Scattered Technology

The good thing about advancements in AI, IoT, and machine learning is that there are many technology vendors—even hundreds of applications to choose from.

The challenge: these technology solutions aren't easily integrated to deliver results industrial companies need ASAP.

# Traceability Technology in Real-World Applications

From aerospace and defense to oil & gas and automotive, industrial manufacturers rely on fully transparent traceability data to track products while in motion and at rest. It's imperative to leverage real-time track and trace solutions to communicate between facility and supply partners.

Clients do both using **BarTender Track & Trace.**

### FedEx Fleet x Track & Trace: Inventory Tracking

The supply chain logistics giant FedEx uses BarTender's inventory tracking platform Track & Traceto reduce aircraft downtime and costs.

With real-time visibility, FedEx can streamline inventory control to find necessary parts for repairs.

- FedEx has saved over $7.5 million in found inventory since implementing Track & Trace.
- Item-level RFID tags now identify missing parts to prevent costly repair delays.
- Real-time data insights aid FedEx fleet forecasting, procurement, and management.

Track & Trace can be used in many industrial manufacturing applications to achieve similar results.

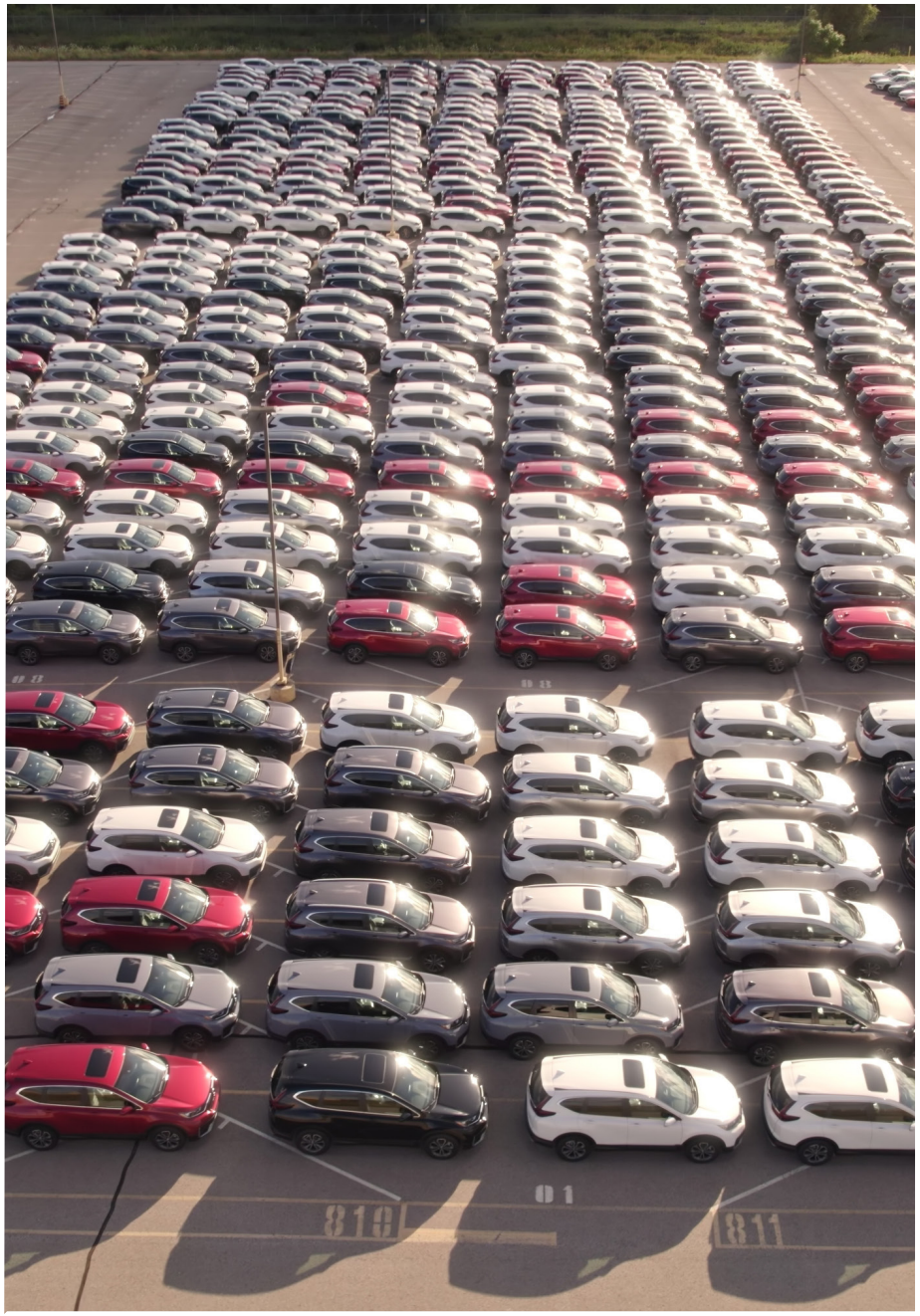
## Honda x Track & Trace: Real-Time Asset Tracking

Honda Manufacturing of Indiana stores and inspects up to 30,000 vehicles at a time. To track vehicles that need inspection or repair, this facility requires a cost-effective RTLS (real-time location system) to keep up with its large and active inventory.

Here's how BarTender Track & Trace enabled the Honda facility to improve productivity and reduce product loss:

- Assign RFID tags to vehicles
- Implement Dock Door Discrimination to keep track of vehicles entering and exiting the lot
- Install solar-powered antenna readers on storage lot service roads to accurately identify and locate vehicles
- Use RFID and GPS technology to geolocate large items in crowded outdoor storage yards

This is one example of how traceability supports organizations at the facility level.



## Tosca x Track & Trace: Full Observability of Asset Pools

Tosca is a leading global company supplying reusable containers. Their processes involve not only production but also tracking, managing, receiving, washing, and redistributing reusable containers between customers and end-users.

To track complex operations throughout the supply chain, Tosca needed an accurate, global-scale solution. BarTender and Coriel delivered end-to-end traceability technology to:

- Scan thousands of item-level RFID codes per minute and associate items with designated pallets
- Capture and remove damaged products to ensure repair before redistribution
- Deploy high-performance data capture for accurate company insights
- Track returnable transit items with complete visibility
  This large-scale traceability system now operates with 99% accuracy throughout countries in Europe.

**Learn more about this real-world application here.**

# Real-Time Item-Level Visibility for Your Operation

With the evolution of Industry 4.0 and digital tracking, industrial logistics must now exist in a fully integrated ecosystem. Advanced traceability technology is non-negotiable for companies that want to operate with greater efficiency, compliance, and sustainability.

Track & Trace's real-time, item-level asset tracking combines the power of IoT communication, RFID technology, AI, and custom software integrations to scale every step of the manufacturing process.

Real-time, item-level visibility (RTILV) is the future of traceability in manufacturing and beyond. With the flexible, scalable infrastructure of BarTender Track & Trace, industrial companies streamline their intelligent processes and secure their place in the supply chain. All while ensuring compliance, mitigating risk, and increasing ROI.

To adopt advanced RTILV solutions for your operation, contact the experts at BarTender.

# About BarTender

BarTender is a brand of Seagull Software, a global leader in real-time, item-level visibility and label management solutions, dedicated to powering the world's most complex supply chains with innovative tools for traceability, authentication, and automated inventory management.

BarTender software enables businesses across all industries to design, manage, print, and automate the production of labels, barcodes, and RFID tags, ensuring seamless tracking and compliance for over 100 billion unique identifiers each year. Leveraging the Track & Trace high-security, scalable SaaS traceability platform, Seagull delivers end-to-end intelligence, harmonizing data to drive operational efficiency, enhance customer experiences, and reduce risk.

Headquartered in Redmond, Washington, with offices across the United States, Europe, Latin America, and Asia, Seagull empowers businesses worldwide to keep their products moving, traceable, and safe.

Learn more at **bartendersoftware.com.**

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