Leveraging digital traceability to drive sustainability and compliance

Digital traceability enhances transparency, ensures compliance, and elevates supply chain sustainability

Loftware™

White Paper

Sustainability is at the forefront of everyone's minds right now

Governments, companies, supply chain partners, and individual consumers all want to know that the organizations they oversee and/or do business with are doing "the right thing" on the environmental front.

Companies that ignore this reality risk fines and compliance issues, potential supplier issues, and consumers who openly admit that they'll shop elsewhere if they think a company is operating unsustainably. In fact, according to recent research, both Millennial and GenZ shoppers make buying decisions based on their own personal, social, and environmental values, while 62% of GenZ buyers gravitate towards sustainable brands and 73% say they will pay more for sustainable products.

With a strong emphasis on sustainability, digital traceability can help companies deliver on their environmental, social, and governance (ESG) commitments and keep their sustainability-conscious customers happy — all while ensuring compliance with a growing number of green regulations.

Using cloud technology to trace products both upstream and downstream, organizations can effectively manage the product lifecycle, ensure sustainable sourcing, and "walk the walk" when it comes to sustainability. These intelligent supply chains can track, trace, and authenticate goods at every stage of the journey, from raw materials to consumer goods.

Embracing the Digital Product Passport

As regulations evolve and consumer awareness grows, Digital Product Passports (DPPs) are poised to revolutionize the way products are designed, manufactured, distributed, and used. By providing detailed information about a product's journey, DPPs can help reduce environmental impact, improve product quality, support circular economy goals, and enhance product safety.

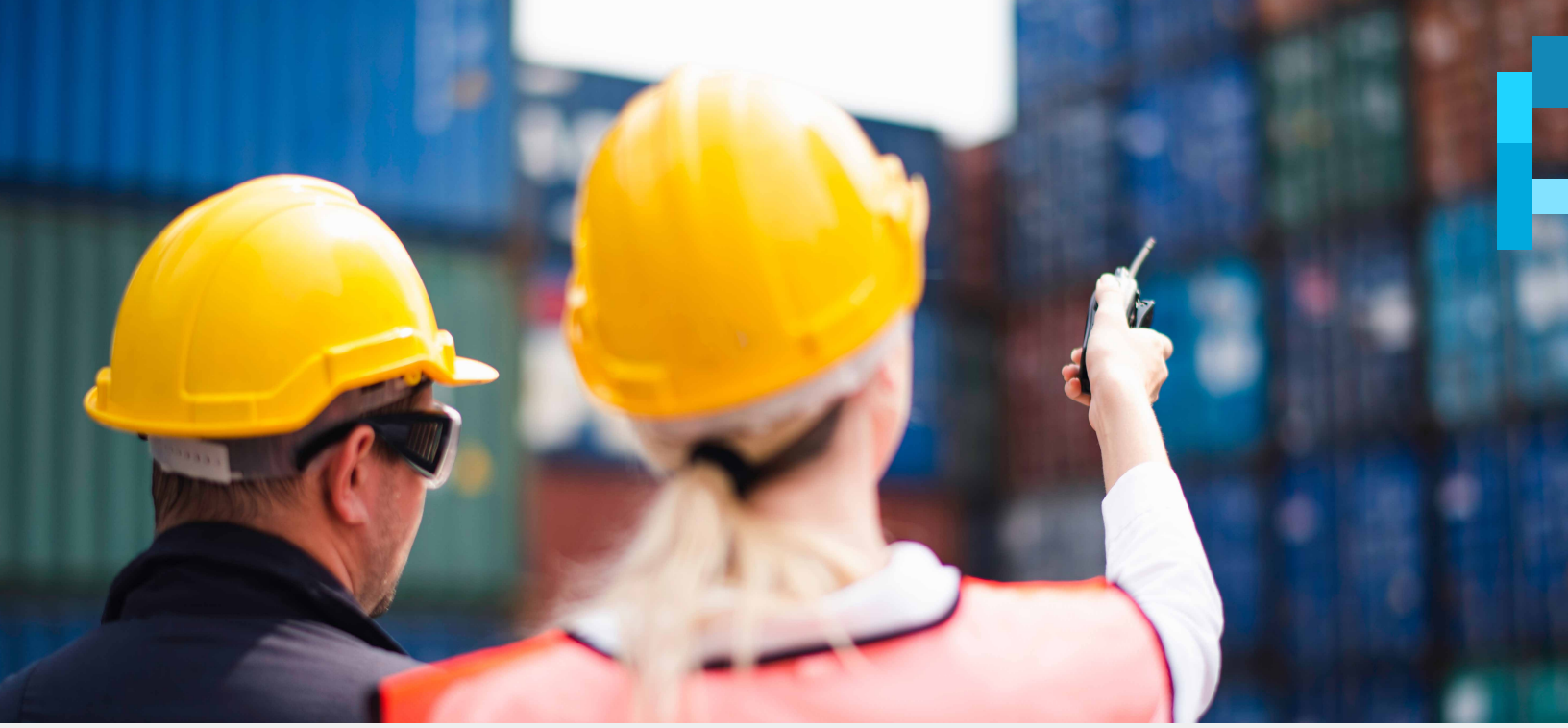
Take industrial battery production, for example. In 2024, the European Parliament approved new rules for the design, production, and waste management of all batteries sold in the European Union (EU). The new rules mandate the use of DPPs for all industrial batteries above 2kWh, which means many European manufacturers must disclose their batteries' carbon footprints.

The EU's new law requires a compulsory carbon footprint declaration and labels for certain vehicles; the use of rechargeable industrial batteries with a capacity above 2kWh; and a digital battery passport for LMT (light means of transport) batteries, industrial batteries with a capacity above 2kWh, and electric vehicle (EV) batteries.

At a broader level, DPPs enable digital traceability by providing a comprehensive and standardized repository of product information (e.g., materials, components and lifecycle data) that's easily accessible across the supply chain via the Cloud. This transparency fosters better sustainability by empowering stakeholders to make informed decisions regarding resource efficiency, recycling, and responsible production.

Companies are embracing DPPs in their global supply chains. According to Loftware's 2025 Top 5 Trends survey:

- 54% of companies say DPPs already play a significant role in enhancing supply chain transparency and sustainability within their industries.
- 63% expect DPPs to be more widely adopted within the next three years.
- 79% say stricter regulations and compliance requirements are pushing their business to adopt sustainability practices.
- 90% believe there is an increased need for connection and collaboration across global supply chains.



An increasing number of forward-thinking companies are also adopting cloud labeling strategies. Digital labels hold all the important details about a product's materials, sustainability, and lifecycle in real-time, making them an essential component in companies' DPP initiatives. Digital labeling strategies provide a full audit trail of a product from its parts, materials and ingredients to its manufacturing and distribution to the end user or customer.

Cloud technologies not only improve supply chain visibility but also reduce waste from traditional labeling processes, lower inventory levels, and cut transportation costs, thereby driving significant savings for the organizations that adopt them.

In fact, 76% of companies that participated in Loftware's survey said their use of cloud technology helped reduce packaging waste, lower carbon emissions, or improve resource consumption. Cloud labeling also helps improve product traceability and authentication, enhances productivity, and helps companies save money.

Sustainability is a key focus for supply chain leaders

More companies are adopting sustainability-driven supply chain practices that may not have even been on their radar screens just 10—15 years ago. They're investing in 2D barcode labeling, linear barcodes, RFID, and other technologies that augment their SAP S/4HANA cloud enterprise resource planning (ERP) systems, all with the goal of developing more sustainable and intelligent enterprises.

As a global standards organization, GS1 actively promotes sustainability within various industries and supports organizations in their quest to implement more sustainable practices. For example, GS1's Global Traceability Standard (GTS) helps organizations implement efficient and effective traceability systems. GTS does this by providing a tested framework for identifying, capturing, and sharing information about products across their complete lifecycles.

GS1 also promotes interoperability and net neutrality, which means that those 2D barcodes, linear barcodes, and RFID labels can effectively transmit data from the product's license holder and share that data across global stakeholders. The organization also supports the use of DPPs for the creation of mandatory data records of sustainability attributes, plus directives on how everyone from regulators to consumers to retailers can access that information. Put simply, GS1 provides the digital link that puts a product's barcode information online in a domain that's owned by the brand. Then, that domain is supported by a specific solution provider's architecture.

"The DPP is where solution providers, brands, and regulators come together in one place to try to make sustainability work across the supply chain," says Eleanor Gayle, community engagement director at GS1, whose UK arm is helping multiple consumer packaged goods (CPG) organizations improve their recycling programs and limit packaging waste. To achieve this goal, CPGs are using the global trade identification numbers (GTINs) encoded in 2D barcodes — specifically, QR codes printed on the label — for soda cans, plastic soda bottles, and other types of packaging. Consumers can access those QR codes to better understand the sustainability initiatives of the brands they buy from.

GS1 has also worked on material identification projects for the apparel industry, which must be able to identify where its raw materials are coming from to maintain and expand its own sustainability initiatives. Again, these efforts require cloud labeling solutions that not only capture critical information but also support the sharing of that data across all stakeholders — right down to the individual consumer.

Embracing and leveraging digital identities

Apparel manufacturing is an industry sector that governments view as being ripe for better sustainability practices. With this in mind, some companies in the industry are embracing the use of DPPs to ensure better upstream and downstream traceability in their supply chains. These organizations are embracing and leveraging their products' digital identities which, in turn, can be recorded on a QR code using a GS1-enabled digital link and a cloud labeling platform.

Upon scanning that code, individuals gain access to a plethora of metadata. For example, a consumer shopping for gently-used handbags can use the QR code to verify an item's authenticity while the seller gets an endorsement from the brand itself.

"Digital product passports are empowering the apparel industry to meet sustainability goals while also creating new value for brands and consumers," said Piet de Vriendt, Senior Manager at Kezzler, a traceability software provider helping companies implement DPPs. "By integrating digital identities, brands can authenticate items in resale markets, extend product lifecycles, and enhance transparency for both new and secondhand buyers. This approach fosters trust, supports circularity, and positions companies to meet growing regulatory demands."

In the life sciences industry, DPPs are being used for SAP Advanced Track and Trace for Pharmaceuticals (ATTP) that SAP launched in 2015. SAP ATTP provides a corporate serialization repository and serial number management in support of anti-counterfeiting initiatives. The solution integrates with ERP and warehouse processing, packaging lines, and supply chain partners such as 3PLs and Contract Manufacturers.

SAP Information Collaboration Hub for Life Sciences facilitates the messaging of traceability data across the pharma supply network, enabling you to "connect ONCE and share with MANY." This SAP cloud service, which includes SAP business partner onboarding services, complements the SAP Advanced Track and Trace for Pharmaceuticals offering for serialization and country reporting. Additionally, it supports regular reporting to the various government traceability systems and the verification of saleable returns according to US DSCSA. This not only helps life sciences organizations meet ESG compliance requirements, but it also supports effective and efficient collaboration across supply chain partners. This, in turn, helps these companies meet their sustainability goals at every stage of the supply chain.

When supported by a modern cloud labeling solution, companies across all sectors can more effectively identify, track, and respond to both existing and emerging sustainability requirements. Life sciences companies can track their products from raw materials to final consumption — and all points in between. This is an effective way to prevent circumvention of counterfeit protection.

Mitigate risks, save money, and improve overall performance

As organizations continue to navigate an increasingly complex global landscape, the value of having a sustainable supply chain can't be overstated. By adopting digital technologies and sustainable practices, companies can effectively mitigate risks, reduce costs, improve overall performance, and keep their end customers happy.

Ultimately, a sustainable supply chain is a resilient supply chain. Cloud labeling and DPPs are building blocks for these. By embracing innovation, companies can enhance transparency, reduce their environmental impacts, and improve operational efficiency. It's time to harness the power of data and technology to create a more sustainable future for everyone.

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No matter what the challenge – digital transformation, time to market, or brand authenticity – Loftware can help you make your mark. We understand how global supply chains work and know that each item you produce, and ship is an expression of your company's brand. We can help you improve accuracy, traceability, and compliance while improving the quality, speed, and efficiency of your labeling. Our end-to-end cloud-based labeling platform helps businesses of all sizes manage labeling across their operations and supply chain and our solutions are used to print over 51 billion labels every year. Loftware also fosters supply chain agility and supports evolving customer and regulatory requirements, helping companies save over $200 million in fines annually. And with over 500 industry experts and 1,000 global partners, Loftware maintains a global presence with offices in the US, UK, Germany, Slovenia, China, and Singapore making us a trusted partner for companies in automotive, chemicals, clinical trials, consumer products, electronics, food & beverage, manufacturing, medical device, pharmaceuticals, retail/apparel and more.

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