

2D Codes in Retail

Driving Supply Chain Transparency and Sustainable Circularity



Introduction: Market Challenges & Industry Pain Points

As retail and consumer goods industries adapt to a world of increased transparency, sustainability demands, and regulatory oversight, the need for **innovative digital solutions** has never been greater. Companies face mounting pressure from global frameworks like the **EU Green Deal** and the emerging **Digital Product Passport (DPP)** legislation, while simultaneously dealing with rampant counterfeit products, fragmented data flows, and limited traceability.

Despite advancements in digital transformation, many organizations struggle to gain full visibility over their supply chains. Manual processes and legacy systems often hinder **real-time traceability** and **product lifecycle insights**. In this context, **2D codes** emerge not as just another barcode but as a foundational technology capable of transforming how businesses operate and engage with stakeholders across the product journey.

The Power of 2D Codes: Enabling Supply Chain Transformation

2D codes, particularly when structured with GS1 Digital Link standards, hold the potential to reshape retail supply chains. These codes allow the embedding of **extensive, dynamic data** within a single scan. This capability facilitates serialization and activates **digital services** that follow the product across its entire lifecycle.

They support serialization for item-level identification, real-time traceability, dynamic expiration updates, and Digital Product Passports that consolidate compliance, sustainability, and user engagement data. More than identification, they enable **intelligent, responsive, and transparent supply chains**.

Industry Insights: Market Feedback & Readiness

Industry events and collaborative forums have highlighted that companies are shifting from awareness to action. Stakeholders now ask how to assign and manage **dynamic data** on products in real time, especially during production.

Organizations are increasingly interested in leveraging 2D codes for **delivering tailored content** to consumers versus warehouse staff, and flagging supply chain status such as "in warehouse", "in store", or "sold". These features spark meaningful engagement and clarify **real-world applications**.

Additionally, **2D codes** are becoming valuable not only in operations but also as tools for engagement, serving as **digital touchpoints** for customers or prospects during product demos or retail interaction, with the potential to capture leads or trigger further digital journeys.

Technical Implementation: Making 2D Codes Work in Retail

Implementation requires aligning high-speed code generation, cloud-based data integration, and contextual logic. **GoodsTag's platform connects** these pieces across the product lifecycle.

A **phased rollout** starting with batch-level serialization, adopting GS1 Digital Link standards, and piloting select SKUs can **reduce friction and maximize ROI**. Staff training and internal enablement are also key to successful adoption.



GoodsTag's 2D Codes are context sensitive: A single code can serve **multiple use cases**, e.g. supply chain and consumer touchpoint for retail, delivering the right information to the right people at the right time.

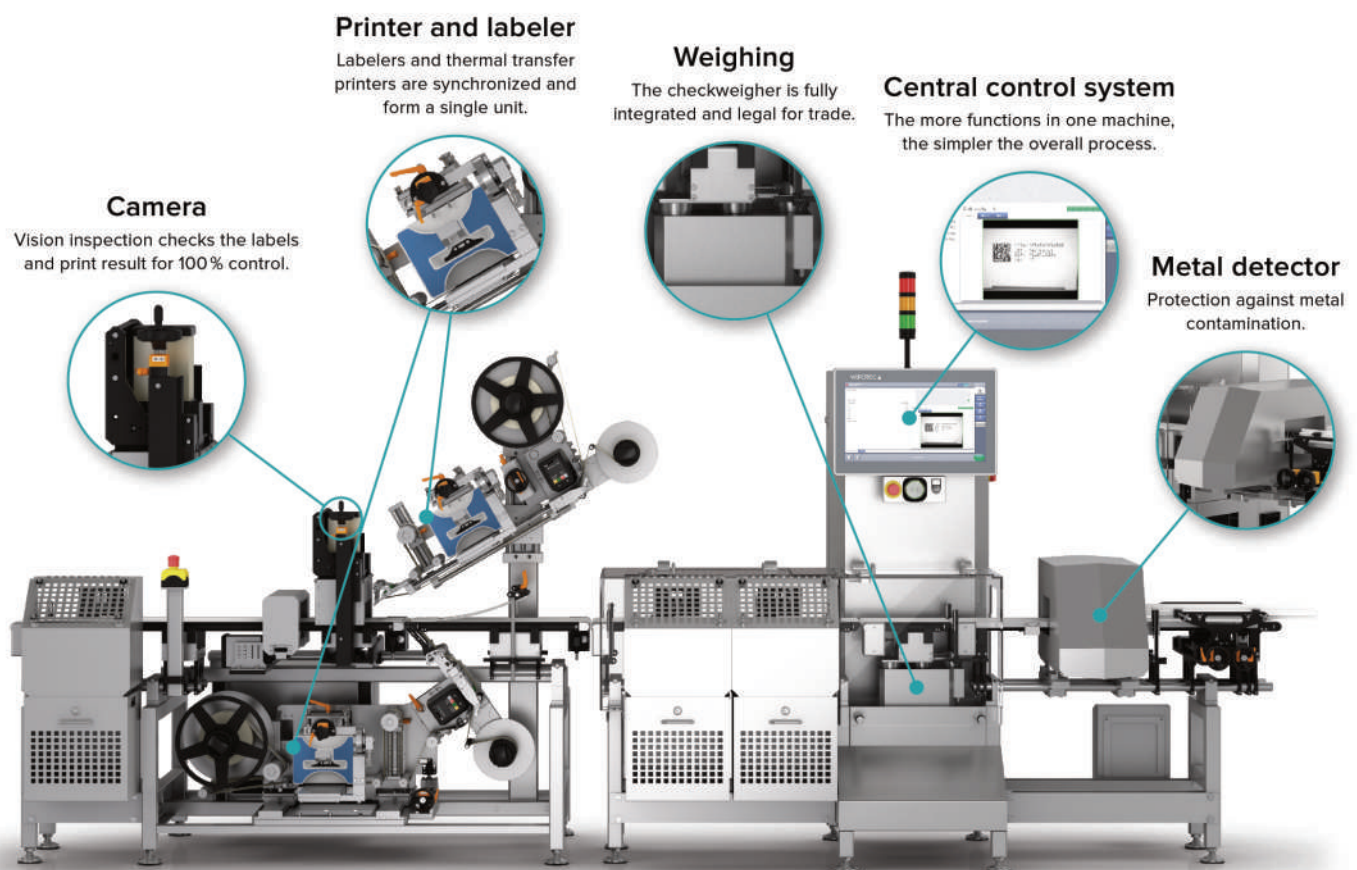
Enabling Implementation: Expert Input from Wipotec

Wipotec, as a leading expert in **precision marking systems**, plays a critical role in enabling the physical implementation of serialized product identification. Their advanced printing technology ensures high-speed, reliable labeling that integrates seamlessly with broader digital strategies.

GoodsTag orchestrates the **lifecycle** of each item with a cloud-based platform that powers serialization, dynamic data, and contextual content delivery.

The integration of **Wipotec's expert solutions with GoodsTag's digital backbone** ensures a seamless path from physical marking to real-time traceability and compliance.

This expert collaboration enables standards-compliant deployment across production lines, ERP systems, and customer-facing applications in creating a **connected, transparent product journey**.



Wipotec provides expert solutions for industrial marking and labelling needs. This image highlights the modular components of **Wipotec's high-performance marking and inspection system**. Integrated modules for printing, camera verification, rejection, and user interface work together in a **single compact unit**.

Expert Insight:

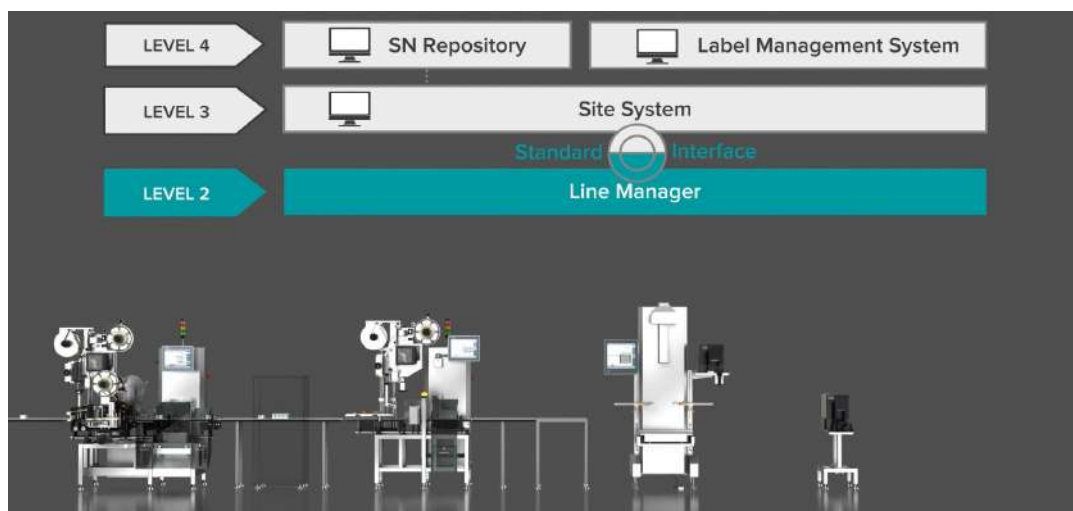
Daniel Anders, **Product Manager Track and Trace** at Wipotec:

"When **every individual package** is expected to carry a **dynamic 2D code**, it introduces a clear new requirement for production: the code must be generated inline, filled with variable data, and verified immediately after printing – all at full line speed. Relying on loosely connected standalone devices like printers, cameras, and controllers often leads to complex integration efforts, extended setup times, and a higher risk of errors during operation. That's why it makes sense to **unite marking, verification, labeling**, and, if necessary, **weighing** into a single system. Only with this level of integration can interfaces be cleanly defined, data securely exchanged, and automated processes reliably executed.

In practice, the more structured the communication between machine, production line, and IT systems, the more stable and efficient the operation – especially when frequent product changes or regulatory demands like the **Digital Product Passport** come

into play. A **unified system architecture** not only simplifies validation and reduces training efforts but also ensures that quality data reaches the right place – whether it's the MES, a customer interface, or the ERP system. Choosing integrated technology is therefore not just a technical upgrade. It's a **strategic step** toward greater transparency, process reliability, and long-term manufacturing efficiency.

This is exactly where the **GoodsTag platform** reveals its full potential. The inline-generated, verified, and structurally managed codes seamlessly feed into the **digital product lifecycle logic** enabled by GoodsTag. To ensure that dynamic, value-rich content can emerge directly from production, print systems, camera validation, and data provisioning must interact flawlessly with the cloud platform. Standardized interfaces and consistent data flows are key to making this integration work. The result: **maximum transparency, real-time responsiveness, and new interaction opportunities** all the way to the **end consumer**. On this foundation, initiatives like the Digital Product Passport are not only achievable – they are positioned for **lasting success**."



*The modular architecture of **Wipotec's Track & Trace solution**: Automated packaging equipment (Level 2) connects to the Line Manager, which interfaces with the Site System (Level 3) and enterprise-level platforms such as the SN Repository and Label Management System (Level 4). This **end-to-end integration** enables secure serialization, efficient label control, and full product traceability across the entire production process.*

Future Vision & Market Readiness

As the **GS1 2D code transition** and **EU regulatory milestones** approach, businesses must prepare for more complex data and compliance demands. **Common barriers** include **costs**, integration with **legacy systems**, and **uneven standard adoption** across regions.

Despite this, early adopters will **benefit** from **improved traceability**, stronger **customer trust**, and **futureproof infrastructure**. Joint content and coordinated resources between solution providers will help drive adoption by building **industry credibility**.

Conclusion & Call to Action

2D codes represent a **foundational shift** not just in how products are identified, but in how businesses interact with them across the lifecycle.

Companies embracing serialization and digital platforms today will reduce counterfeiting, meet

DPP and GS1 compliance, and unlock new opportunities for consumer engagement and **circularity**.

GoodsTag provides the digital backbone for this transformation, enabling brands to build transparent, connected, and future-ready supply chains. To ensure the highest standards in physical product marking and labeling, GoodsTag works with **expert partners** such as **Wipotec**, whose precision systems guarantee secure and reliable implementation on the production line.

Now is the time to act!

By collaborating with digital platform leaders like **GoodsTag** and drawing on the specialized expertise of implementation partners such as **Wipotec**, brands can lead the next era of **connected, transparent retail** through pilot programs and scalable ecosystem solutions.

This white paper was developed by GoodsTag with expert contribution from Wipotec, a leading provider of marking and inspection solutions for industrial production environments.

Ready to future-proof your supply chain?

Request a demo to see how our Smart Digital Product Passports can drive your circular economy initiatives and boost supply chain efficiency.

For inquiries, please scan here:



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