

Unlocking Traceability and Consumer Engagement with 2D Codes

25 September 2026 | Interviews | By Shraddha Warde|shraddha.warde@mmactiv.com

The transition involves more than simply changing the code printed on packaging



Viktor Hermansson, Global Marketing Director at Markem-Imaje

As the food and beverage industry prepares for GS1 Sunrise 2027, the shift from traditional one-dimensional barcodes to GS1 Digital Link-enabled 2D QR codes is set to reshape packaging, traceability and consumer engagement. Beyond serving as a means of product identification, 2D codes can connect physical products with richer data on batches, dates, manufacturing, sustainability and consumer-facing information, while helping manufacturers strengthen operational visibility and supply chain traceability.

For food and beverage manufacturers, however, the transition involves more than simply changing the code printed on packaging. It requires accurate data, integration between enterprise and production systems, reliable printing and verification, and infrastructure capable of supporting both operational and consumer-facing applications. Connected packaging can also enable brands to deliver dynamic experiences, from nutritional and allergen information to recipes, promotions, recycling guidance and personalised content.

In this Interview with NUFFOODS Spectrum, Viktor Hermansson, Global Marketing Director at Markem-Imaje, discusses how manufacturers can prepare for GS1 Sunrise 2027, the challenges associated with implementing 2D codes, and the role of connected packaging in strengthening traceability and transparency. He also explains how Markem-Imaje's CoLOS software solutions support data integration, code verification and digital consumer engagement, and shares his perspective on how food and beverage companies can build future-ready packaging infrastructure beyond 2027.

How will the transition to GS1 Digital Link 2D barcodes under GS1 Sunrise 2027 impact food and beverage manufacturers, particularly in terms of packaging operations, traceability and consumer information?

The transition from traditional 1D barcodes to GS1 Digital Link-enabled 2D QR codes creates a major opportunity for food and beverage manufacturers to unlock more value from their packaging. Beyond carrying basic product information, the code can become a connected gateway to richer product, production, packaging and consumer information, helping brands improve traceability, support compliance, streamline operations and deliver more engaging consumer experiences. To realise that opportunity, manufacturers need to start with the practical decisions that determine how the code will be created, printed, verified and connected to data.

From a packaging operations perspective, manufacturers need to define what data should be included in the code, what use cases they want to support and whether they should use pre-printed labels, inline printing or a combination of both. If variable information such as batch number, best-before date, serial number or production site is being added during production, manufacturers need systems that can manage data traffic and synchronisation between the production line, printer and relevant databases without affecting overall equipment effectiveness.

For traceability, GS1 Digital Link creates an opportunity to connect the physical product to a much richer digital identity. A single 2D code can carry or connect to information such as GTIN, lot number, date information, serial number and manufacturing data. This can support supply chain visibility, recall handling, product authentication and more accurate inventory management.

For consumers, the same code can become a trusted route to product information. A shopper scanning a product can access nutrition, allergen, origin, sustainability, recycling or brand-authorised content. This gives food and beverage brands a way to provide more transparent, relevant and up-to-date information without relying only on the physical pack, while also enabling a two-way communication channel directly with consumers through surveys, reviews, feedback tools and other digital experiences.

What are the key challenges you are seeing among FMCG and food manufacturers as they prepare to move from traditional barcodes to 2D QR codes, and how do CoLOS 2D Activate and CoLOS 2D Engage address these challenges?

The biggest challenge is that GS1 Digital Link is not only about printing a new code. It depends on the quality of the data and the infrastructure behind it.

Many manufacturers still have gaps between enterprise systems and factory-floor operations. McKinsey research shows that while most industrial companies are implementing digital and analytics solutions, only about one in five report high levels of success, with fragmented data landscapes and complex legacy infrastructure among the main barriers to building robust, secure architecture across IT and OT systems.

Product, batch, date, serialisation and packaging data may sit in Enterprise Resource Planning (ERP), Manufacturing Execution System (MES), Warehouse Management System (WMS) or other business systems, while coding and labelling processes on the line may still rely on manual steps. In fact, manual entry is responsible for approximately 20 per cent of production mistakes¹, including incorrect packaging and printing errors. That creates risk, particularly in fast-moving food and beverage environments where errors can lead to rework, rejected goods, retailer fines or even recalls.

Another challenge is code quality. A GS1 Digital Link QR code must be created correctly, printed clearly and verified at production speed so that it can scan reliably at the point of sale and across the supply chain.

For example, Markem-Imaje's CoLOS software and solutions support these requirements by connecting packaging, barcode and production data from enterprise systems so the right code goes on the right product and packaging. It helps reduce manual data entry, supports GS1-compliant code creation and enables integration with production systems, printers and vision inspection.

By linking software directly with vision systems, CoLOS performs real-time inspection of printed codes, validating package/job selections, check-grading barcode quality and detecting damaged, smudged or displaced codes directly after being printed.

CoLOS 2D Activate gives manufacturers control of GS1 Digital Link QR codes after printing through digital content management, URL destination management, scan data analytics and extended enterprise data integration. CoLOS 2D Engage enables marketing teams to design, publish and manage personalised consumer experiences, including mobile landing pages, forms, campaigns and multilingual content. CoLOS 2D Engage then manages the consumer experience once the QR code has been scanned, enabling marketing teams to manage what consumers see, how they interact with

the brand and how engagement data is captured.

Together, these solutions help manufacturers manage both the operational and consumer-facing sides of connected packaging.

How can dynamic GS1 Digital Link QR codes help food brands go beyond regulatory compliance to deliver personalised experiences such as recipes, product information, promotions and sustainability content?

Dynamic GS1 Digital Link QR codes allow food brands to treat packaging as a connected digital communication channel rather than a static label. By embedding live production data into the QR code, such as batch, lot, date or serialisation information, brands can support more relevant consumer experiences while also enabling more efficient brand protection and recall handling.

This means the same physical product can connect consumers to different types of content depending on the use case. A consumer may scan a product to access recipe ideas, usage instructions, nutritional information, allergen details, sustainability information, recycling guidance, promotions or loyalty content.

Because the content is managed digitally, brands can update destinations and experiences over time without redesigning the physical pack. This is particularly valuable for seasonal campaigns, localised promotions, product education, sustainability storytelling or consumer support.

It also creates a stronger feedback loop between brands and consumers. By monitoring scan data and engagement patterns, brands can better understand how people interact with their products before and after purchase. This can help inform future marketing, product development and customer engagement strategies.

What role can connected packaging play in improving product traceability and transparency across the food supply chain, particularly through information such as GTINs, batch numbers, best-before dates and manufacturing data?

Connected packaging can make product information more accessible, more accurate and more useful across the supply chain.

A GS1 Digital Link QR code can connect a physical product to key data points such as GTIN, batch number, best-before date, serial number and manufacturing facility information. When this information is linked to enterprise and production systems, it can support traceability, compliance, inventory accuracy, recall handling and quality control.

For food and beverage manufacturers, this is especially important because production is often high-volume, fast-moving and highly regulated. If an issue occurs, having accurate product and batch-level information makes it easier to identify affected products, protect consumers, respond quickly and reduce unnecessary waste.

For retailers, connected packaging can also support expiry management and stock rotation. By making best-before dates and product data more accessible, retailers can improve availability, manage freshness and cut food waste.

For consumers, connected packaging provides a route to clearer information about the product they are buying, including origin, nutritional information, sustainability data and safety-related updates.

How does the integration of CoLOS with ERP, CRM and other enterprise systems help manufacturers maintain a single source of truth for product and packaging data while reducing the risk of coding errors?

The value of connected packaging depends on reliable data. If production data is manually entered or copied between systems, the risk of error increases.

CoLOS helps address this by connecting packaging operations with enterprise systems such as ERP, MES, WMS, CRM platforms and other data sources. This allows approved product and production data to be pulled directly into coding, labelling and packaging workflows, reducing the need for operators to re-enter information manually.

In practice, this helps manufacturers maintain a single source of truth for product and packaging data. The right information can be applied to the right product, in the right format, at the right time. Vision and verification systems can then check that the code has been printed correctly before products leave the line.

This reduces the risk of mismatched packaging, incorrect codes, poor print quality and shipping errors. It also supports stronger traceability because production events and packaging data can be reported back into business systems, creating a more accurate operational record.

Looking beyond GS1 Sunrise 2027, what do you see as the next major opportunities for connected packaging in the food and beverage industry, and how can manufacturers ensure that the infrastructure they invest in today remains future-ready?

Beyond GS1 Sunrise 2027, connected packaging will become increasingly important as manufacturers respond to rising expectations around transparency, traceability, sustainability and consumer engagement.

One major opportunity is the creation of richer digital product identities. Connected packaging can support authentication, recall handling, expiry management, recycling information, consumer education, loyalty programmes and personalised digital experiences.

Another opportunity is operational. By connecting packaging data with enterprise systems and production equipment, manufacturers can reduce manual intervention, improve visibility, support faster decision-making and build more resilient production environments.

To remain future-ready, manufacturers should avoid treating 2D codes as a standalone project. They need a scalable infrastructure that can connect hardware, software, data management, printing, inspection and consumer engagement. They should also prioritise clean data, flexible integration with existing enterprise systems and secure platforms that can support both on-premises and cloud-based deployment.

The sooner brands start building this infrastructure, the better prepared they will be for future regulatory changes. New requirements will continue to emerge, but manufacturers with connected, accurate and accessible product data will be in a much stronger position to respond quickly and efficiently.

The manufacturers that gain the most value will be those that use GS1 Digital Link as a foundation for broader connected product strategies, rather than only as a compliance requirement.