

Next Generation Barcodes

Business opportunities for retail



1. Executive Summary

Retailers face rising operational challenges, stricter regulation, and increasing safety expectations. The Next Generation Barcodes (the QR Code powered by GS1 & GS1 DataMatrix) are a way to address these challenges by combining GTIN, batch and expiry data in one data carrier, enabling automated expiry checks, faster recalls, accurate markdowns, and tailored consumer engagement.

For retailers and its franchisees, this transition towards Next Generation Barcodes delivers reduced labour cost, lower waste, stronger compliance, and a futureproof standard ahead of the 2027 point-of-sale (POS) target. Early adopters in Europe such as Tesco, Mercadona, Norgesgruppen & Zapka are already unlocking up to 44% food waste reduction, 21% reduced labour in expiry management and noticeable reduced complaints for expired products.

Retailer private label products are currently the fastest, lowest, starting point for the Next Generation Barcodes due to their high market share in Belgium and Luxemburg, their closed environment and the retailer's control over packaging and data.

Aligned with GS1's global guidance and the goal of achieving next generation point-of-sale scanning by end of 2027, this business case outlines value propositions and an implementation roadmap for retailers and franchisees.

2. Why Retail needs Next Generation Barcodes

2.1. The Industry Shift to Next Generation Barcodes

The global GS1 Industry has made the commitment for retail POS-systems to be capable of reading the GTIN from both linear and Next Generation Barcodes by 2027.

Why?

Because current data carriers such as linear barcodes risk not meeting emerging consumer, operational or regulatory needs.

Why now?

This an opportunity to avoid rising waste – and compliance costs, recalls, yearly packaging updates and inefficient store operations. Early adopters in Europe:



NorgesGruppen

During the transition, products will often carry both the traditional linear barcode and a QR code by GS1 or Datamatrix. Private labels have a unique position since they operate in a closed, controlled environment and can avoid having 2 different data carriers on their packaging.

A-Brand

Transition 2027



Ambition 2027



Private label



2.2. Operational Inefficiencies

Despite years of process optimisation, stores still rely on manual date checks and markdown relabelling in tight shelf-life categories such as fresh, meat, dairy and ready-to-eat. These routines are necessarily sample based and inconsistent, creating blind spots that let products approach or pass expiry unnoticed and make markdown execution vary by shift and/or store.

> 20%

profit margin opportunity

Recent research from ECR Retail Loss¹ quantifies how costly these manual processes really are. The hidden costs of expiry management (staff time, markdowns, redistribution, and disposal) can reach up to 1.8% of sales revenue. For many retailers operating at low margins, this hidden 1.8% is the difference between profit and loss. **Halving this cost could already lift profits by more than 20%.**

The labour tied up in checking dates, marking down, and backroom handling is recurring, undermeasured, and avoidable. These costs are often buried across the entire supply chain (store staff labour, waste, logistics), which means they are easy to underestimate and hard to manage.

This 1.8% leakage is not the result of staff behaviour, but of the structural limitations of current data carriers, which cannot carry the product specific data required to automate these tasks. In chapter 3 we outline the alternative, and in chapter 4 how this process can be done more efficient and automated.

¹ [New research reveals the £78 billion hidden cost of managing unsold and surplus food | University of Portsmouth](#)

2.3. Consumer Challenges

Consumers face information overload at the shelf. Multiple signals, like barcodes, QR codes, certification symbols, are all competing for attention. This leads to a confused customer who doesn't know what to scan, interpret and find the correct information. According to Accenture, this confusion is a major barrier for engagement and purchase decisions².

Brand owners are increasingly placing different types of information on product packaging to serve diverse supply chain, production and marketing purposes. While well-intentioned, the outcome can result in a visual dense and less appealing packaging.

And it's not just the brand owners. Regulatory bodies from various levels and departments advocate for using a separate data carrier to serve a certain purpose. If this movement continues, our packaging will become as cluttered as in the illustration.

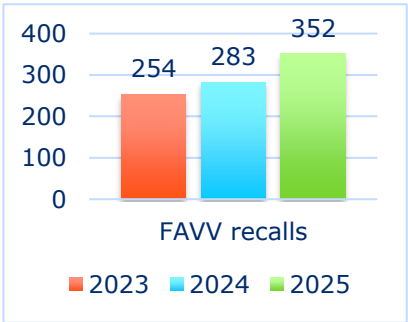


2.4. Regulatory Pressure

2.4.1. Safety

In Belgium, there is a steady rise of recalled products, driven by stricter vigilance from safety authorities and higher safety expectations from consumers:

Indicator	Impact
Average cost per recall	€9.5 million
Share driven by reputational damage	Up to 80%
Regulatory trend	Increasing inspections by FAVV/AFSCA
Most exposed segment	Private label

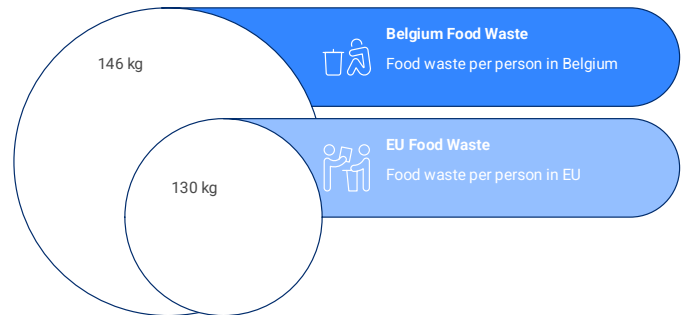


² Accenture The Empowered Consumer (2024)

2.4.2. Cost of Waste

Waste in retail continues to be a major economic and regulatory concern on EU level.

- Belgium generated 146 kg of food waste per person in 2023, exceeding the EU average by 12%³.
- The EU Waste Framework Directive sets a retail 30% food waste reduction target by 2030.
- More pressure on private label due to their presence in the fresh segment.



2.4.3. Compliance

The last decade, we have seen a lot of regulatory requirements in the EU, driven by digital transparency for enterprises, products and processes. Not reacting to these regulations could lead to an operational burden and packaging complexity.

- For non-food products, the current Ecodesign for Sustainable Products Regulation (ESPR) and the related Digital Product Passport (DPP) will progressively apply from 2026 to 2030.
- Food categories face other requirements:
 - Full nutritional disclosure (e.g. Wine and Spirits regulation).
 - Evolving food-safety rules & responsibilities for retailers via Commission Regulation 2024/2895.

Since retailer act as a private label brand owner, they are legally considered the producer and must comply with. This regulatory pressure pushes certain private label segments to transition to dynamic packaging such as Next Generation Barcodes.

³ Eurostat - Food waste and food waste prevention (2025) - Eurostat

3. What is the Next Generation Barcodes?

3.1. One Symbol replacing many

The Next Generation Barcodes refer to GS1-compliant 2D data carriers that can store both the product identifier (GTIN) and additional structured data in a single code. They are designed to replace the multiple symbols currently printed on packaging by providing one standardised data carrier that works across all retail and supply-chain environments.

The Next Generation Barcodes is the broader term for 2 specific GS1 compliant data carriers. More information can be found in our guideline on Next Generation Barcodes in retail⁴.

3.2. GS1 Digital Link Resolver

 (01)09521101530001	 (01)09521101530001
QR Code powered by GS1	GS1 DataMatrix
• Used for consumer engagement as it connects to the web without needing an app or <u>specialised</u> solution. • Scans at point-of-sale. • Encodes additional data, e.g., for traceability and safety.	• Encodes additional data, e.g., for traceability and safety. • Essential for regulated healthcare products, including those sold directly to the consumer. • Scans at point-of-sale and point-of-care. • Provides opportunities to connect to the web using apps and specialised solutions. • Offers a very compact way to encode data.

When a shopper scans a QR Code powered by GS1, nothing special is required: no exclusive app, no complicated setup. A simple smartphone camera scan leads directly to a clean, familiar product webpage that your digital teams can update using the same tools they already use today.

But the real strength of QR Codes powered by GS1 goes further. Behind the scenes, GS1 standards, optionally, also enable smarter interactions when the code is scanned by a retailer app, staff device, or compliance tool. Using a GS1-Conformant Resolver⁵, these apps can request specific, context-dependent information.

In other words, the same QR code on pack adapts to the user. For consumers, a regular camera scan opens a clean product page with accessible marketing information.



**Scan the QR
Code powered
by GS1 and
explore**

⁴ <https://ref.gs1.org/guidelines/2d-in-retail/>

⁵ <https://ref.gs1.org/standards/resolver/>

GS1 Created a GS1 Digital Link App to simulate the Next Generation Barcode experience. Using this app demonstrates what happens when the same QR code is scanned by different environments: Point-Of-Sale, Recycle app, Promotional App and certificate check. Every scan returns tailored context-based information in return.



This allows all parties to access the right information at the right moment, without changing the packaging and without confusing the shopper. Other use cases could be:

- A Digital Product Passport for regulatory bodies
- Detailed information on allergens for consumers
- Safety & User manuals for after-sales support

Please note that the Ambition 2027, mainly focuses on the ability to scan Next Generation Barcodes at the point of sale, using the data elements in the barcode itself and the use or implementation of a Resolver service is an optional add-on.

3.3. Private Label Opportunity

Private label is strategically a quick way to introduce Next Generation Barcodes because retailers control packaging and are closely linked to production. This allows consistent adoption across categories. These closed environments make implementation more predictable and enabling early operational value long before full industry transition. With private labels representing 37% of the Belgian market, retailers can scale quickly and create a unified, future-proof identification standard across their own brands.

Due to their closed environments, private labels don't need to work with both a linear barcode and a QR Code powered by GS1 and move directly to a single barcode on pack⁶.

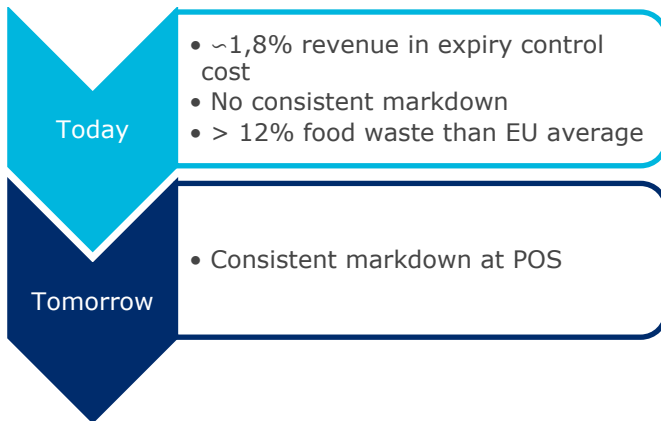
⁶ <https://ref.gs1.org/docs/2025/single-2D-barcode-for-private-label-products>

4. Retail Use Cases & Impact

This section outlines use cases where Next Generation Barcodes unlock measurable impact. These use cases demonstrate how private labels can serve as a controlled environment for adoption ahead of the 2027 milestone.

4.1. Waste Reduction

Next Generation Barcodes enable retailers to move from manual expiry routines to consistent waste prevention. This creates a unified process across shifts and stores, reducing blind spots and ensuring products approaching expiry are identified early and handled correctly.



Benefits

- ↓ labour cost in fresh segments
- ↓ waste through consistency
- ↑ accurate and timely markdowns
- ↑ customer experience and trust

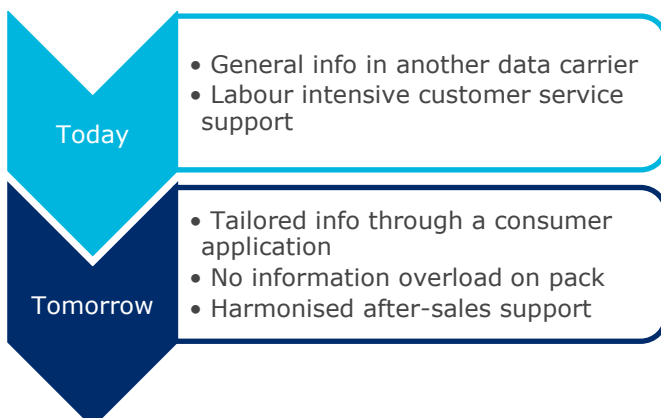


Testimony

- 21% ↑ productivity in the expiry control for fresh categories⁷
~ Woolworth Australia
- 44% ↓ Food waste by mid-2024
~ NorgesGruppen⁸

4.2. Consumer Engagement

Instead of managing multiple QR codes, URLs, or campaign specific symbols, a single QR Code by GS1 with a Digital Link Resolver can route consumers to the information depending on the context. This enables retailers to deliver personalised experiences without changing packaging on every occasion. It also allows to extend product support beyond the store by giving customers access to all relevant after-sales information.



Benefits

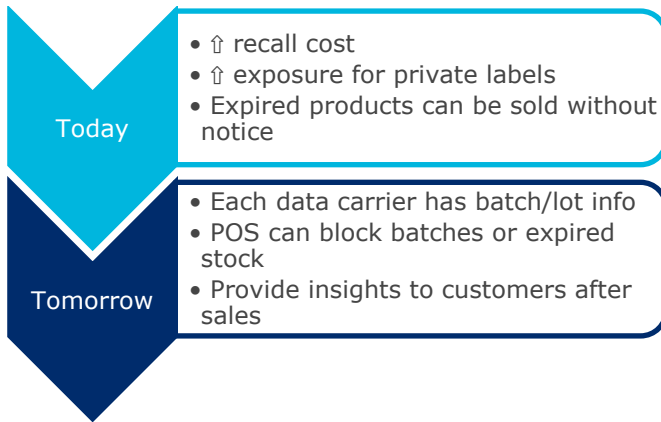
- Personalised marketing
- ↓ complaints

⁷ [Woolworths Australia seeing multiple benefits from 2D barcodes](#)

⁸ [GS1 UK | NorgesGruppen's fight against food waste](#)

4.3. Safety

Next Generation Barcodes give retailers access to batch, lot and expiry dates at scan, enabling automatic blocking of expired or recalled items at POS. This replaces today's broad and labour-heavy recall checks with targeted product removal. Private label ranges gain stronger protection with less operational effort. Together, these capabilities reduce reputational risk and strengthen overall product safety.



Benefits

- Targeted product removal
- ↓ labour costs
- ↓ reputational risk

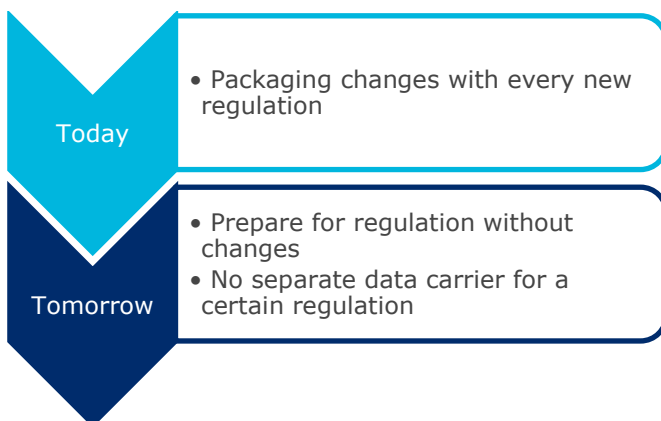


Testimony

- 7-Eleven has seen increased rates of consumer satisfaction and complaints about expired products went to zero

4.4. Compliance

As a private label brand owner, a retailer is legally the producer of private label SKUs. Regulations such as PPWR, ESPR and the related Digital Product Passport (DPP) pose a lot of requirements on brand owners starting 2026 and finalised in 2030. Although the industry still awaits the Delegated Acts for the different product categories, a dynamic identifier can future-proof your resilience to upcoming regulations.



Benefits

- Avoid compliance risks
- No outdated packaging

5. Financial Summary

The transition to Next Generation Barcodes creates value across waste reduction, labour efficiency, compliance, and brand protection. While each retailer's baseline differs, pilots already show strong direct benefits across fresh categories and private label ranges. Below you can find a final summary of the value drivers and cost considerations for this transition.

5.1 Value Drivers

WASTE REDUCTION	CONSUMER ENGAGEMENT
• ∞ 1,8% revenue in expiry control cost • ∞ 21% productivity improvement	• Tailored info app • Harmonised after-sales support
SAFETY	COMPLIANCE
• Batch & BBD block at POS	• Regulation proof

5.2 Implementation Costs

The cost for unlocking this value involves limited upfront cost considerations depending on the size, scale, and ownership model of the retailer. Below you can find the main adjustments to be considering:



Scanner configuration

Most of the current scanner models of Datalogic, Zebra or Honeywell for sale already can scan Next Generation Barcodes. On the website of GS1 GO⁹ you can find a checklist to see if your scanner complies with the necessary criteria.



POS adaptation

To process scanner information containing Next Generation Barcodes. Your POS-system needs to be able to process GS1 Element string syntax. Some Belgium retailers who can already scan variable weight items or Datamatrix data carriers have this option enabled.



Packaging update

Updating of all linear barcodes to a Next Generation Barcodes, purely depending on the product type, packaging, - range and - data elements required for scanning.



(Optional) resolver set-up

A GS1-conformant resolver allows retailers to dynamically control what customers, staff, or regulators see when they scan a QR Code powered by GS1.



Store training

On new expiry & inventory management processes & revised markdown workflows to make expiry control faster & more accurate.

⁹ [2D Barcodes POS Solutions](#) | [2D Barcodes at Point of Sale](#) | [GS1](#)

6 Implementation Roadmap

Phase 0 - MOBILISE	Phase 1 - BUILD	Phase 2 - PILOT
Confirm pilot objectives, KPIs, and success criteria. Select 5-10 private label SKUs and 3-5 stores for the pilot. Secure vendor support and GS1 compliance alignment.	Configure POS and scanners for 2D barcode capability and readability in pilot stores. (Optional) Set up GS1 Digital Link resolver for basic product info. Prepare packaging for selected SKUs and train store staff.	Launch pilot in chosen stores with limited SKUs. Test key use cases. Monitor operational impact and customer feedback.
Phase 3 - SCALE	Phase 4 - OPTIMISE	Phase 5 - FINALISE
Expand pilot to additional SKUs and stores based on learnings. Introduce dynamic content updates for marketing and compliance. Begin measuring financial impact	Fine-tune processes and technology based on scaling results. Document ROI and build business case for full rollout. Align roadmap with industry-wide readiness for 2027.	Validate long-term performance. Integrate learnings enterprise-wide. Prepare organisation for transition beyond pilot scope.

Appendix A – One-Page Executive Summaries

A.1 Solution providers one-pager

[one pager for solution providers](#)

A.2 Franchisees one-pager

[one pager for franchisees](#)