GUIDE

for using GS1 2D codes in consumer engagement

SUMMARY

Guide for using GS1 2D codes in consumer engagement

The global transition from traditional EAN barcodes to using GS1 2D codes is progressing rapidly. At the moment of publication of this guide, there are ongoing 2D pilots in a total of 48 countries, which represents 88.5 percent of the global GDP. There are incentives for promoting the use of the code because it offers many opportunities for developing the entire sector from the perspective of both consumer engagement as well as the supply chain. In order to guarantee the competitiveness of our companies, it is important for Finland to be a part of this development.

From the consumers' perspective, the new two-dimensional barcode by GS1 represents a significant step forward in the accessibility of product information. The GS1 2D code consumer engagement model described in this guide is a step towards the deployment of the code in the Finnish market. The guide details how the GS1 2D code can be utilised in communicating about products to consumers. The objective is to facilitate consumers' access to product-related information, instructions and inspiring content while also providing companies a new channel for engaging in dialogue with consumers.

In the guide, we propose breaking down the steps for implementing the GS1 2D code in order to make the process easier to organise and carry out in phases. This step-by-step development ensures that companies do not need to make large investments outright in order to deploy 2D codes and that the resources, development and investments can be carried out in a planned manner, guided by the company's own needs. Of all of the ways of using the GS1 2D code, consumer engagement is the easiest to implement because it provides the opportunity to experiment and develop the concept lightly.

The purpose of the GS1 2D code user guide

The GS1 2D code consumer engagement guide details how companies can go about using the GS1 2D code. It includes:

- use cases in which consumer engagement could be made more effective with the GS1 2D code
- instructions on how the data content must be structured in compliance with the GS1 Digital Link data content standard and which factors should be considered in locating the code on the packaging in order for the code to also work at checkouts in the future
- guidelines to consider in using the domain included in the code and landing page it leads to as well as on marketing the GS1 2D code
- a roadmap detailing how a company could go about deploying the GS1 2D code from a consumer engagement perspective.

The GS1 2D code refers to a QR code powered by GS1 with data content that complies with the GS1 Digital Link standard.

→

Consumer engagement using the GS1 2D code

Create a GS1 2D code with data content that complies with the GS1 Digital Link standard

Add the code to the product packaging. An EAN barcode is required during the transition phase. After the transition phase, a GS1 2D code alone is enough.

When a consumer scans the code they are redirected to the product information online.

Changes in the pages shown are managed using redirections, which means that the codes on the product packages do not have to be changed.

Project presentation

The Food Data Finland growth engine program brings together parties from primary production, food industry and retail trade to develop a food chain that makes use of data and GS1 standards. The project introduces a practical aspect to data co-operation in the form of jointly implemented development projects. This way, members of the network can act as pioneers in utilising uniform data in the food chain and be the first to make use of the data created by the co-operation in their business.

In September 2023, GS1 launched a development project in connection with the program regarding the consumer engagement model of the GS1 2D code. The development project was completed in January 2024, and resulted in a proposal on how companies of the food chain could make use of the GS1 2D code in their consumer engagement. The proposal is based on utilising GS1 standards. In order to draw up the model and survey related needs, GS1 carried out workshops in collaboration with food industry and convenience goods companies. The user guide is based strongly on the consumer perspective, meaning the information needs and desires related to the consumer's purchasing process.

We would like to thank the following companies for their help during the project

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Introduction

The GS1 2D code makes consumer-facing product communication more effective

The new two-dimensional barcode by GS1 represents a significant step forward in the accessibility of product information. The GS1 2D code consumer engagement model described in this guide is a step towards the deployment of the code in the Finnish market. The guide details how the GS1 2D code can be utilised on communicating about products to consumers, thus facilitating their access to information.

The global transition from traditional EAN barcodes to using GS1 2D codes is progressing rapidly. At the moment of publication of this guide, there are ongoing 2D pilots in a total of 48 countries, which represents 88.5 per cent of the global GDP. There are incentives for promoting the use of the code because it offers many opportunities for developing the entire sector from the perspective of both consumer engagement as well as the supply chain.

Companies of the GS1 Global Office board have set a global goal: all retailers should have the ability to scan GS1 2D codes at checkouts by the year 2027. That requires, in addition to compatible checkout scanner technology, that packages have 2D barcodes that are compliant with the GS1 standard. In order to guarantee the competitiveness of our companies, it is important for Finland to be a part of this development.

The global implementation of the GS1 2D code is going forward rapidly. Now is the time to pilot!

P&G supports the global transition to 2D barcodes that use GS1 standards

In October 2023, Jon Moeller, the President and CEO of Procter & Gamble, the world's largest manufacturer of consumer goods, sent a letter to the board of directors of the international Consumer Goods Forum in which he highlights that replacing traditional barcodes with the new and more versatile GS1 2D codes should be a key focus area for the sector. The letter aims to explain why the transition is critical to the sector, shed light on the benefits and especially help various parties understand their own role in implementing the change.

// We expect that 2D barcodes adoption will grow at different rates around the world, but one thing is certain: those that accelerate through this transformation the fastest will be best positioned to unlock valuable new capabilities and benefits.

- Jon R. Moeller
Chairman of the Board,
President and Chief Executive Officer,
Procter & Gamble

Growing data needs steer toward using the GS1 2D code

Food product manufacturers, importers and retailers are already communicating about their products, brands and companies in a variety of different channels. However, in the future there will be new requirements related to the production and display of product-related information both due to legislation and consumer behaviour. It is clear that in the future actors of the food chain will be required to collaborate more closely in order to gather together and pass on information along the value chain, all the way to the consumer. The GS1 2D code is a way for bringing product information directly from the packaging to consumers and the entire value chain.

Different information and marketing content is needed for various consumer groups. In addition, the data needs may vary between different product categories both due to legislation and consumer behaviour. The GS1 Digital Link data content standard of the GS1 2D code can help provide an agile response to changing data needs in a way that does not require packaging changes.

A GS1 2D code can be scanned using a smartphone, like a regular QR code, as well as with a checkout terminal, like a traditional EAN barcode.

Benefits of the GS1 2D code

The GS1 2D code is a step forward compared to the current situation and has many benefits. The code allows bringing product information directly from the packaging to consumers and the entire value chain. Changes in the information linked from the code do not require changes to packaging.

- **easier** – one code for several use cases
- **more consumer-friendly** – steers directly to product information online
- **more up-to-date** – changes are easy to make
- **more cost-effective** – packaging does not have to be changed, thanks to redirecting

User guide to support the deployment of the GS1 2D code

In order to grow the competitiveness and export capacity of the Finnish food chain, we carried out a development project in collaboration with food and consumer goods parties in which we created a user guide for utilising the GS1 2D code in consumer engagement. Part of the Food Data Finland program, the development project involved representatives of the growth engine program's founding organisations. We also made use of GS1's international network. This way we could ensure that the model takes into consideration the perspectives of different parties as well as lessons learned during other deployments carried out in other parts of the world.

This guide details how companies can go about using the GS1 2D code. It describes various use cases in which consumer engagement could be made more effective with the GS1 2D code. It instructs how the data content must be structured in compliance with the GS1 Digital Link data content standard and which factors should be considered in locating the code on the packaging in order for the code to also work at checkouts in the future. In addition, the consumer engagement model described in the guide provides guidelines to consider in using the domain included in the code and landing page it leads to as well as on marketing the GS1 2D code.

The objective is to facilitate consumers' access to product-related information, instructions and inspiring content while also providing companies a new channel for engaging in dialogue with consumers.

A roadmap detailing how a company could go about deploying the GS1 2D code from a consumer engagement perspective is also included towards the end of the guide. As such, the guide provides companies of various sizes the opportunity to develop a shared understanding and capacities for efficient use of the code. The objective is to facilitate consumers' access to product-related information, instructions and inspiring content while also providing companies a new channel for engaging in dialogue with consumers.

Proposed progress of the implementation

PHASE 1

Utilising the GS1 2D code in consumer-facing communications

PHASE 2

Including more detailed data, such as batch and date into the GS1 2D code

Use in consumer engagement during the first phase

We propose deploying the GS1 2D code in the Finnish market in phases and the first phase would be to use the code in consumer-facing communications. Including other data, such as details on batch and dates will impose greater process and system changes on companies and for this reason these aspects would be implemented later.

Deploying the GS1 2D code in phases is based on a survey we carried out regarding consumer goods and food sector companies' competencies and requirements for the deployment of the GS1 2D code. Several companies in the sector participated in the interviews, ranging from market-leaders to small product manufacturers. The survey was completed in June 2023.

" The GS1 2D code opens up extensive opportunities for companies to develop their consumer communications. You can start right away! GS1 experts can help you identify development targets and practical steps forward that meet your business needs.

Laura Juntunen
CGO, GS1 Finland Oy

Overview of the market

Transition from traditional barcodes to next-generation GS1 2D codes is already underway globally. Successful pilot projects have been conducted in the United States, Australia and Brazil and several are currently ongoing. The following presents a few examples, specifically from the perspective of consumer engagement. The examples highlight pilot companies' choices that could offer useful insights to implementation by Finnish companies.

United Kingdom

LANDING PAGES THAT INCLUDE SIMILAR ELEMENTS

GS1 UK, together with its customers, is conducting a pilot programme on the use of GS1 2D codes. The pilots test and demonstrate the opportunities of the GS1 2D code from the perspective of consumer engagement. They will also be used to develop the GS1 Digital Link Resolver, a management tool for hyperlink redirections, together with solution providers. The programme will continue until May 2024 and the goal is to involve a total of fifty GS1 UK client companies. Two participating small companies, Ntsama's and Little Bobby Jebb, have already published their solutions.

In their pilots, the companies ended up including the product's GTIN in the GS1 2D code together with a link that directs to a landing page with many links. The page is used to direct the consumer to various online data sources. Landing pages of various companies include similar elements, aiming for a uniform consumer experience within the UK market. The landing pages were implemented by two solutions provider that participate in the pilot programme. Alternatively, the companies could have also chosen to implement their own landing pages.

The companies that participate in the pilot themselves manage what is shown to a consumer who scans the GS1 2D code and they can also change the content whenever they like. The content includes product information, sustainability and marketing pages as well as social media pages.

The companies utilise subdomains in the codes' data content, which their web administrators can use to make redirections to the desired sites. This way the companies are able to monitor consumer behaviour and update their content without ever having to change the codes in their physical packaging.

The GS1 2D codes have been formed in a way that allows them to be also read at shop checkouts in the future. In practice, the code includes product-level data including GTIN, but the companies can also include more specific information, such as batch number or best before date, if they so wish.
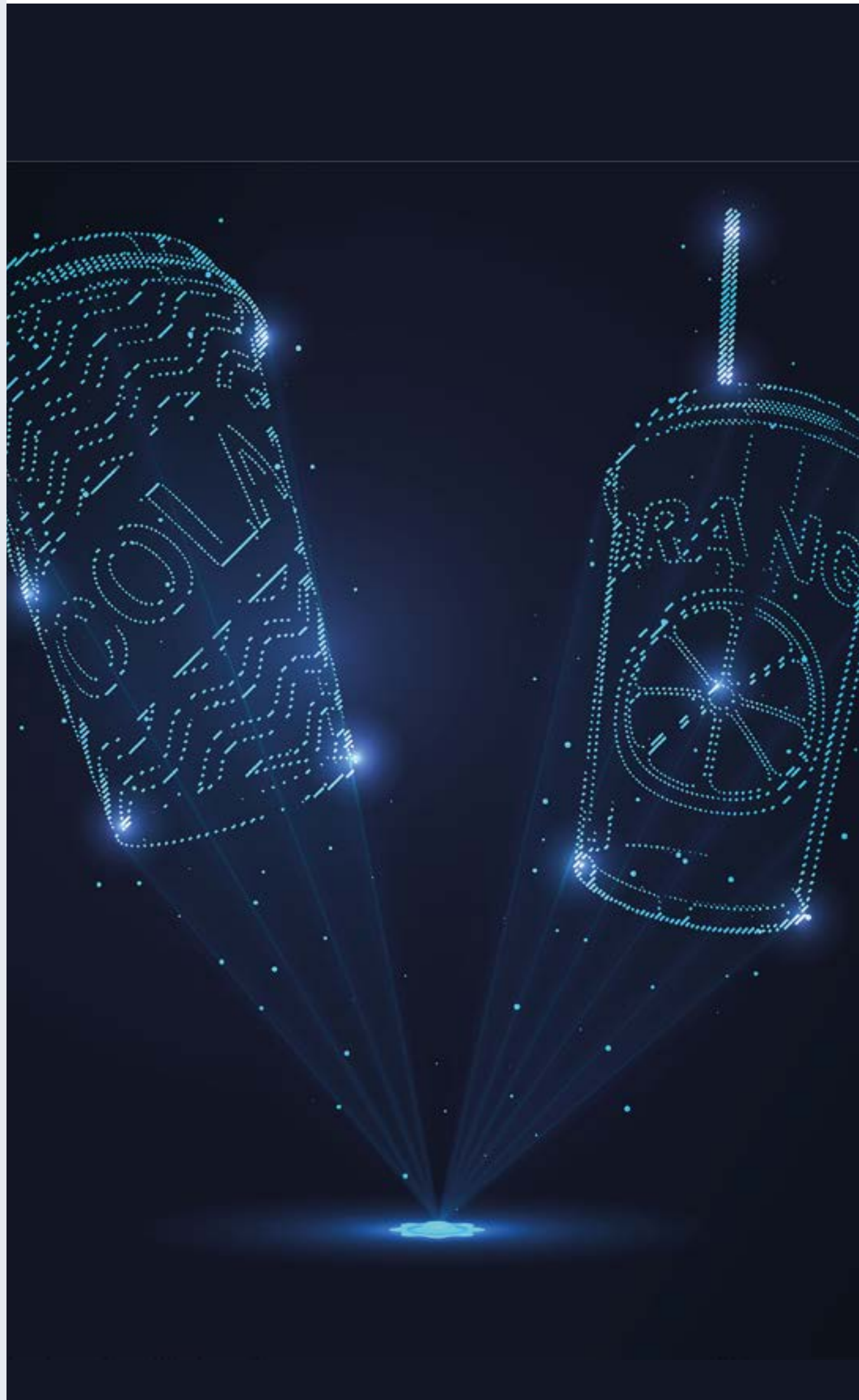
Australia

TARGETED AND MULTI-LINGUAL COMMUNICATION

In order to develop the consumer engagement of their product packaging, the Australian Mildura Fruit Company chose GS1 2D codes because they allow consumers to read the codes using their smartphone camera, without a separately downloadable app. The choice was also supported by the desire of ensuring future compatibility with retail point of sale.

The GS1 2D codes on Mildura Fruit Company's products direct consumers to a separate microsite, with two different tailored versions. The other one is directed especially to consumers and the other to wholesalers. The microsite is available in English, Chinese and Vietnamese because the company supplies its products to various markets. The user is directed to a specific language version of the site based on the language settings of the device they use.

The microsite provides consumers the opportunity to review the product's authenticity certificate, a comprehensive product description and storage instructions. It also provides an opportunity to submit consumer feedback directly to the producer of the fruits in the packaging, establishing an interactive channel between the consumer and the primary production. The site also includes stories from the Mildura Fruit Company along with images and maps that present the origin of the fruits.

United States

ADDING PRODUCT INFORMATION TO THE PRODUCT PAGE USING IFRAME

The US based corporation PepsiCo uses GS1 2D codes in consumer engagement of their packaging. The company's solution uses a digital platform called SmartLabel by the Consumer Brands Association as the data source. The SmartLabel platform features approximately one thousand brands and has data for roughly one hundred thousand products. The platform offers, among other information, ingredient statements, information about allergens and certificates, maintained by the product manufacturers. PepsiCo provides the product information they maintain using the platform on product pages of their brands.

PepsiCo product packaging features QR codes with data content that is compliant with the GS1 Digital Link standard and includes a GTIN. The GS1 Digital Link URI, the link of the QR code redirects to the product's website that includes information from the SmartLabel platform, embedded using iframe technology. When the consumer clicks on, for example, the nutritional information within the iframe, the website sends out an API call to the SmartLabel platform, fetching up-to-date information that is then displayed on the product page. The benefit of using iframe is that the consumer does not move away from the brand's website in order to see the information. In addition, PepsiCo does not have to update its product information separately to its website, but they only have to keep them updated on the SmartLabel platform.

The GS1 2D codes on PepsiCo products redirect to PepsiCo's website, which allows PepsiCo to maintain control of the information displayed using the link. In addition to the data displayed from the SmartLabel platform, the consumer can also be shown other content, which can also be updated as needed.

Consumer engagement use cases of the GS1 2D code

The opportunities the GS1 2D codes offer consumer engagement are presented below in the form of use cases. These help understand the series of events in which different actors in the chain and the consumer come across data shared by each other.

Two of the identified use cases are presented in more detail in the development project. Some of the identified use cases, which have been left out, have already been described in the guide for the data model of food sustainability. In addition, situations in which information specific to the production batch is required of the product were left outside of the consumer engagement model.

The data model of food sustainability proposes a solution for several identified use cases for the GS1 2D code, such as communicating information on the origin of the product to the consumer.

Identified use cases

Communicating sustainability information to the consumer, such as carbon, water and environmental footprint.

Communicating to the consumer information on the origin of the product and its raw materials.

Opportunity to target and update promotion, competitions and campaigns to the consumer.

Opportunity to easily provide to the consumer recipes, use and storage instructions etc. related to the product.

Opportunity to easily provide to the consumer product-related inspirational content and entertainment, including videos.

Relating batch/lot-specific information on product origin within the value chain.

Communicating information to consumers on packaging materials and recycling the packaging, such as country-specific recycling and sorting instructions.

Opportunity for the consumer to find products that fit their nutritional needs.

Opportunity for the consumer to easily find all of the brand's channels, for example on social media.

Opportunity for the consumer to easily find a feedback channel and contact information for feedback and complaints related to the product.

Opportunity for the consumer to engage in dialogue with the company, such as product reviews, recommendations, requests, questions and feedback.

Making the product recall process more effective using batch-specific information.

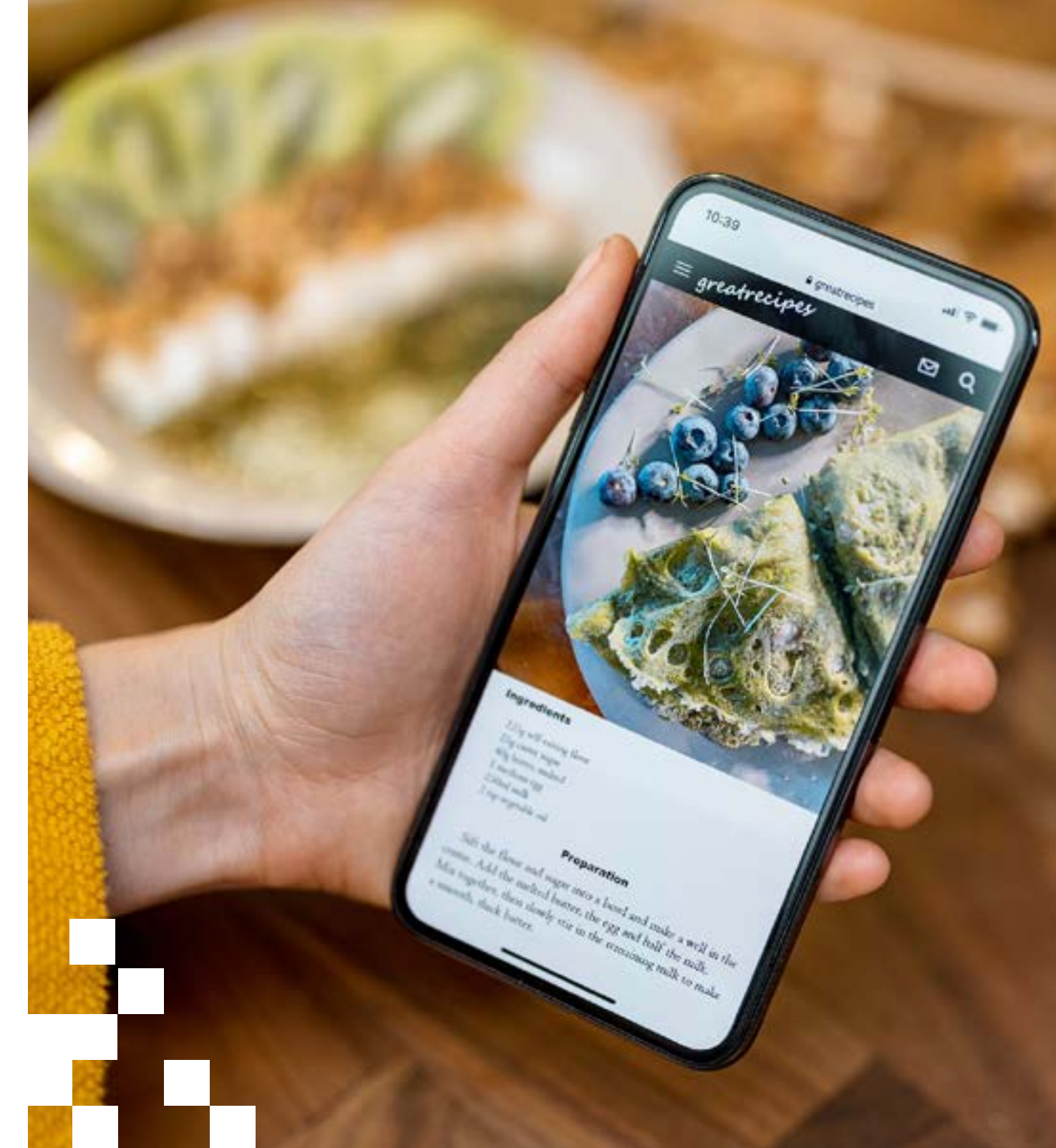# Offering recipes and instructions to the consumer

The GS1 2D code has extensive opportunities for consumer engagement. It allows providing the consumer a variety of information on the characteristics of the product, for different stages of use. Product pages and content that showcase the product can help the consumer make a purchasing decision, while also providing inspirational content related to the product and cooking, such as instructions, recipes and videos.

The GS1 2D code on the packaging is easily accessible, which reduces need for the consumer to search for information from the company's website or using search engines. Using a landing page to which the consumer is redirected from the GS1 2D code facilitates the consumer finding various types of content and choosing the information that currently interests them.

The consumer does not need a separate app to scan the code, but rather current smartphones will read the link in the code directly using the camera. The code should be located on the packaging in such a way that it is visible to the consumer also on a store shelf, for example. Including text on the packaging that encourages scanning the code can increase the consumer's confidence in the safety of the code.

Currently there is already a lot of product-related information and instructions available online. However, the data is often scattered in various locations online, which makes using it more difficult. The consumer has to separately look for information, which leads to the information possibly not being available at the right time. QR codes on the packaging are usually campaign-specific and their links lead to individual marketing pages.

The goal is that the product manufacturer can direct the consumer to product-related information, such as recipes and instructions, directly from the product packaging. The consumer can choose information that interests them at the moment, from a landing page that provides a comprehensive summary of the information. The displayed content can be updated effectively for each season, for example, without having to change the code on the packaging. The provided content can also be utilised on retail groups' platforms and companies' own online stores without having to separately send it to the groups. The product manufacturer can use the analytics of their own website to receive information on consumers who are genuinely interested in the product and purchase them.

Product pages and content that showcase the product can help the consumer make purchasing decisions. Inspirational content related to the product and cooking, such as instructions, recipes and videos can also be offered to support decision-making.

OFFERING PRODUCT-RELATED RECIPES AND INSTRUCTIONS TO THE CONSUMER

Marketing manager Mikko and sales manager Minna are planning the spring marketing content for chicken breast. They come up with the idea of reminding customers about the start of the barbecue season.

Mikko adapts the content linked from the GS1 2D code printed on the packaging and adds instructions on cleaning the barbecue and preparing for the season.

Minna complements the recipes linked from the GS1 2D code with instructions on how to make the perfect barbecue chicken breast and what are some suitable spices and seasonal accompaniments.

Teemu, the father of the Saarinen family notices a package of chicken breast at the store. Inspired by the advertisement, he scans the GS1 2D code on the package. He likes the proposed barbecue recipe and adds the featured garnishes to his shopping list.

At home, Teemu scans the GS1 2D code again and opens the instructions for cleaning the barbecue. He cleans the barbecue, happy that he didn't have to separately look for instructions.

Teemu cooks the food according to the recipe. Finally, he scans the GS1 2D code in order to see the recycling instructions for the packaging.

The Saarinen family is happy with having started the barbecue season. Teemu scans the GS1 2D code once again in order to give positive feedback on the product and the included instructions.

Mikko and Minna are happy with the feedback the product and its marketing content received. Their website analytics provides them plenty of ideas on developing new content.

Offering a feedback channel to the consumer

The GS1 2D code opens up new opportunities for interactive communications. It provides marketers the opportunity to enrich purchasing experiences and offers consumers a new channel for communicating with brands. The code, compliant with the GS1 Digital Link data content standard, enables targeting feedback directly to the correct product. Dialogue with the consumer is more direct and easier when the opportunity to give feedback is provided directly on the packaging, using the code.

Currently giving product feedback is difficult and requires a lot of work as the consumer must search for the contact information of the feedback channel from the product packaging or the manufacturer's product page. Often, the feedback will be directed to the retailer and not directly to the manufacturer, which slows down the process. In addition, feedback from different channels is difficult to aggregate.

The goal is that the consumer is directed to give feedback directly from the GS1 2D code on the packaging. Using the code, the feedback can be targeted to the correct product and possibly even the correct batch. An accessible channel provides the company the opportunity to receive more feedback to improve customer understanding and support product development. At the same time, the consumer can be offered engaging content, such as reviewing products, games or a discussion forum.

Giving feedback becomes faster and, using the code, it can be targeted to the correct product and even the correct production batch.

OFFERING A FEEDBACK CHANNEL TO THE CONSUMER

Product developer Titta is designing a new product for the product family of her biscuit brand and wonders how the consumers have liked the most recent launch.

Johanna, the mother of the Saarinen family, tasted the new biscuit for the first time and liked it. She is wondering how she could give positive feedback to the manufacturer. She scans the GS1 2D code on the packaging.
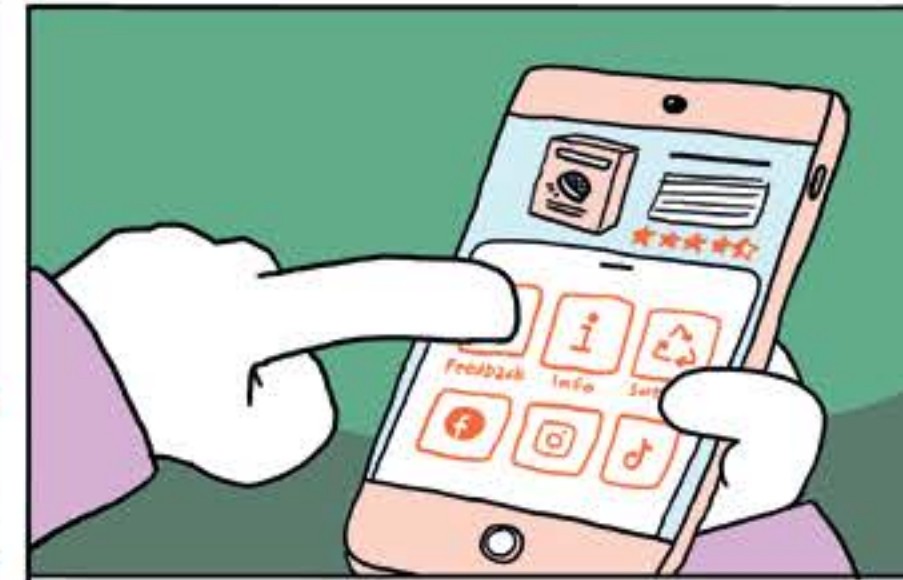
A menu opens up on the screen of Johanna's smartphone with additional information on the product in question as well as reviews by others and a feedback channel.

Johanna writes her feedback and also relates a proposed improvement she came up with. She is glad that giving the feedback was so easy.

The consumer feedback team and product development review the feedback received by the biscuit. Titta gets a lot of ideas how to further develop the product family.

Titta develops a new biscuit using the feedback for help. Johanna is invited to participate in a consumer study for testing and tasting the new biscuit.

The biscuit is rated very highly in the study. Inspired by this, Titta starts to plan the product launch in collaboration with marketing and sales.
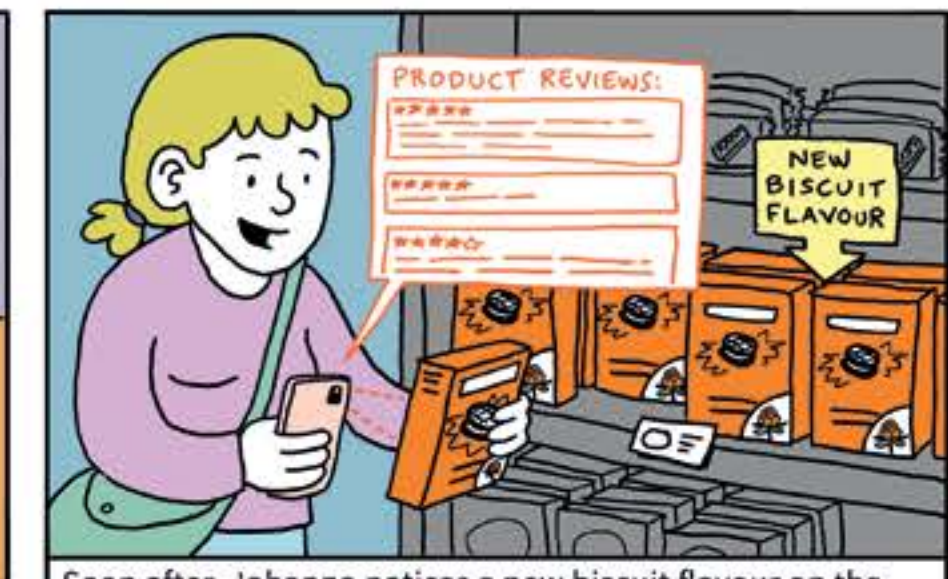
Soon after, Johanna notices a new biscuit flavour on the store shelf. She is glad that her proposal made it via the feedback channel all the way to becoming a new product that has received positive reviews.

The GS1 2D code consumer engagement operational model

The GS1 2D code consumer engagement operational model is focused on the data content, its structure, redirection and landing page structure of the GS1 2D code. In addition, the model defines the location of the code during the transition phase, ensuring usability in different phases of the supply chain, especially on scanning at checkout.
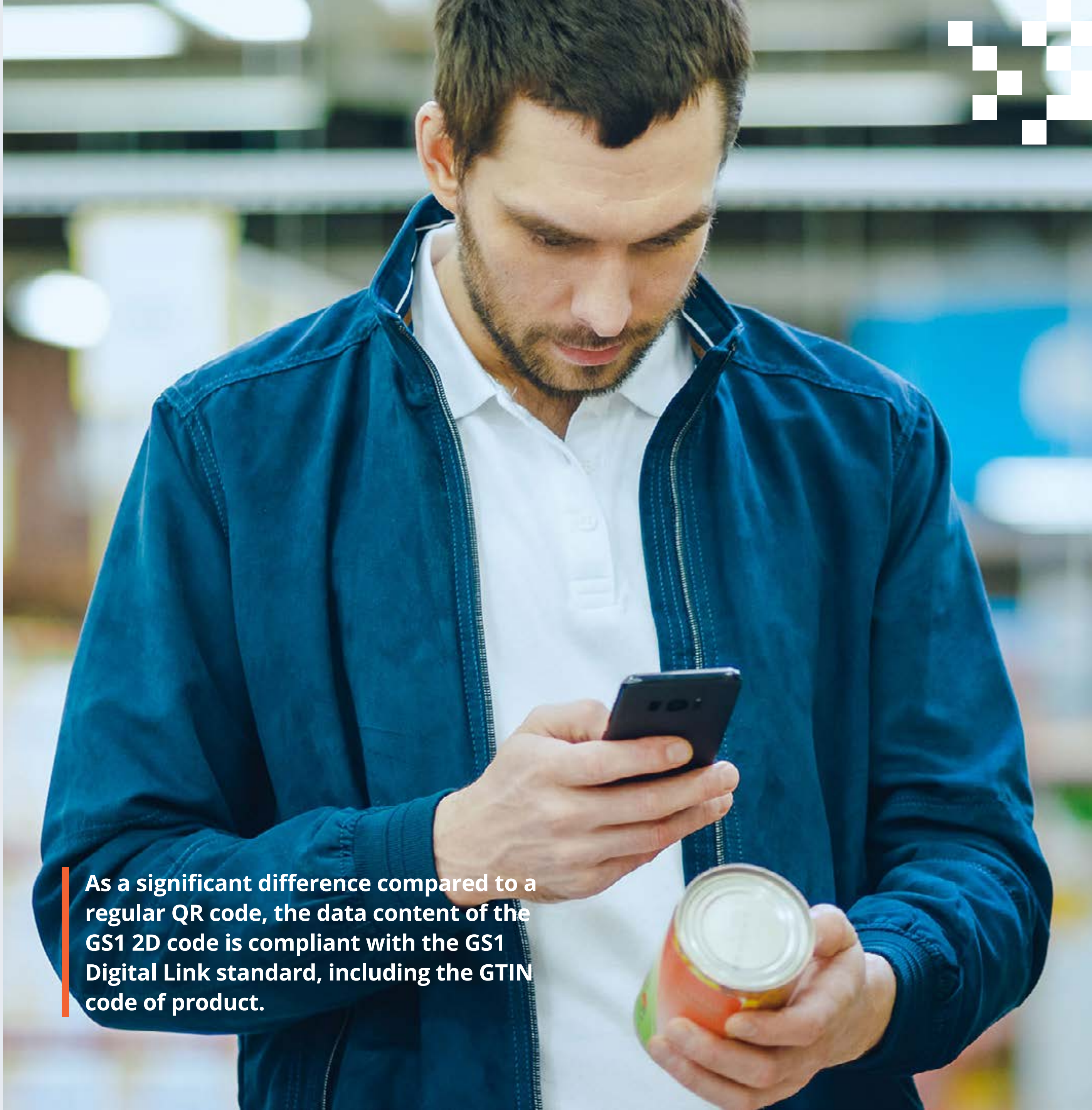
Unlike previous data models by GS1, the GS1 2D code consumer engagement operational model is not focused on relaying information between different parties of the supply chain. The operational model provides the manufacturer the opportunity to use the GS1 2D code according to their own consumer engagement and marketing needs.

Many companies already have 2D codes on their packaging for a variety of purposes. However, these cannot be used at checkout and they only serve a single purpose, such as consumer engagement or internal tracking. Updating the existing 2D codes to be compliant with the GS1 standard can open up new use opportunities and enable interoperability between trading partners and stakeholders. In practice, this means updating the data content of the 2D code to be compliant with the GS1 Digital Link standard.

Product reviews and questions

Competitions and raffles

Best before dates

Social media channels

Origin of raw materials

User instructions

Entertainment and videos

Nutritional information

Recycling instructions

Product carbon footprint

Packaging material information

Product origin

Product batch-specific origin information

Giving feedback

Product water footprint

Do you already have a QR code on your product?

Updating the data content of the code to be compliant with the GS1 standard opens up new ways of using it and enables using the same code at checkout in the future.

Data content of the GS1 2D code

The barcode type of the GS1 2D code can be either QR code or a GS1 DataMatrix. In connection with consumer engagement, the code of choice is the QR code because it can be scanned using a smartphone camera without a separate app. The GS1 2D code differs from a regular QR code by its data content being compliant with the GS1 Digital Link standard. The standard ensures that the codes and the data they contain are uniform in structure and thus portable between different systems and parties as well as readable using checkout terminals.

In compliance with the GS1 Digital Link standard the data is included in the GS1 2D code in the form of a URI (Uniform Resource Identifier). The URL (Uniform Resource Locator) is a specific type of URI that defines the location of a resource on the Internet. Instead of the GS1 2D code using a direct URL address of a website, a permanent URL address compliant with the GS1 Digital Link standard can be created containing also the product's GTIN and possible additional information. The URL can automatically direct to the product information page, for example.

As a significant difference compared to a regular QR code, the data content of the GS1 2D code is compliant with the GS1 Digital Link standard, including the GTIN code of product.

What is a URL address?

URL addresses are used to for accessing websites and other resources on the Internet. Usually, they include a protocol (such as "http" or "https"), domain and a path to a specific resource such as a product information page.

Domain

Any domain can be used with a GS1 2D code because it does not impact the individualisation and identification of the product. The domain defines where the person who scans the GS1 2D code is directed to online. That is why the code can also use a service provider's domain, although it is good to realise that this may lead to a so-called "vendor lock" situation, in which changing the service provider will also require changing the codes printed on the product packaging due to the changing domain. That is why GS1 recommends using the company's own domain for the code. In this case the company can have the domain redirect to content by a new service provider, as necessary.

The recommended approach is to use for the GS1 2D code a subdomain created under the main domain that is reserved for product identification purposes. A subdomain is a section apart from the main domain that is used for a specific use alongside the main domain. Using a subdomain for the

GS1 2D code enables keeping the URL addresses used for product identification unchanged and disconnected from the structure of the actual website. This provides flexibility to the administration of the company's website as there is no need to worry about the link in the 2D code when updating the website, but rather the code can always redirect to the updated target site.

The subdomain can be created on the basis of the domain of the company or one of its brands. (For example company-x. fi > id.company-x.fi or brand-x.fi > id.brand-x.fi). The shorter the GS1 Digital Link URI is, the smaller the space that the GS1 2D code that contains it requires. If the name of the company or brand is very long, it may be necessary to consider creating an entirely separate, abbreviated domain. However, when abbreviating the name it should be considered that this may impact how trustworthy the consumer feels that the address contained in the code is.

What is a subdomain?

A subdomain is entirely in the control of the owner of the domain, but it is separate from other parts of the domain. The purpose is to separate the product identity and location of the website from each other. By using a subdomain you can avoid having the GS1 2D code printed on product packaging stop working in connection with a website update.

Any domain can be used with a GS1 2D code because it does not impact the identification of the product.

Redirection

Redirection refers to directing the visitor to a website from one address to another. The redirection from a permanent URL address that is compliant with the GS1 Digital Link standard can be updated at any time, which means that the content shown to the consumer can be easily changed without making any changes to the packaging.

Redirection is a standard feature of all web servers and usually redirections can be managed using the same content management system that is used for managing the content of the website. Especially with a lower number of products, the redirections can be done using the website content management system, which enables easy piloting of the GS1 2D code.

When the GS1 2D code is used in connection with a larger number of products, using a separate "resolver" solution, intended for managing redirections. For consumer engagement, the point of the resolver is to act as a redirection tool for the GS1 2D code. The company can build the resolver as part of their own systems using open source code or buy it as a separate service from a suitable service provider. The resolver is used for managing the redirection from the address on the GS1 2D code to the desired target pages and it makes the management of these redirections clearer compared to doing it with a website content management system.

The redirections are managed by the website administrator

Redirections are a key part of the World Wide Web and the administrator of any website can create one. Usually, redirections are visible to the end user as a rapid change of the address shown in the address bar of the web browser.

Thanks to the redirections, the content shown to the consumer can be easily changed without making any changes to the packaging.

https://www.examplepage.fi → https://www.newpage.fi
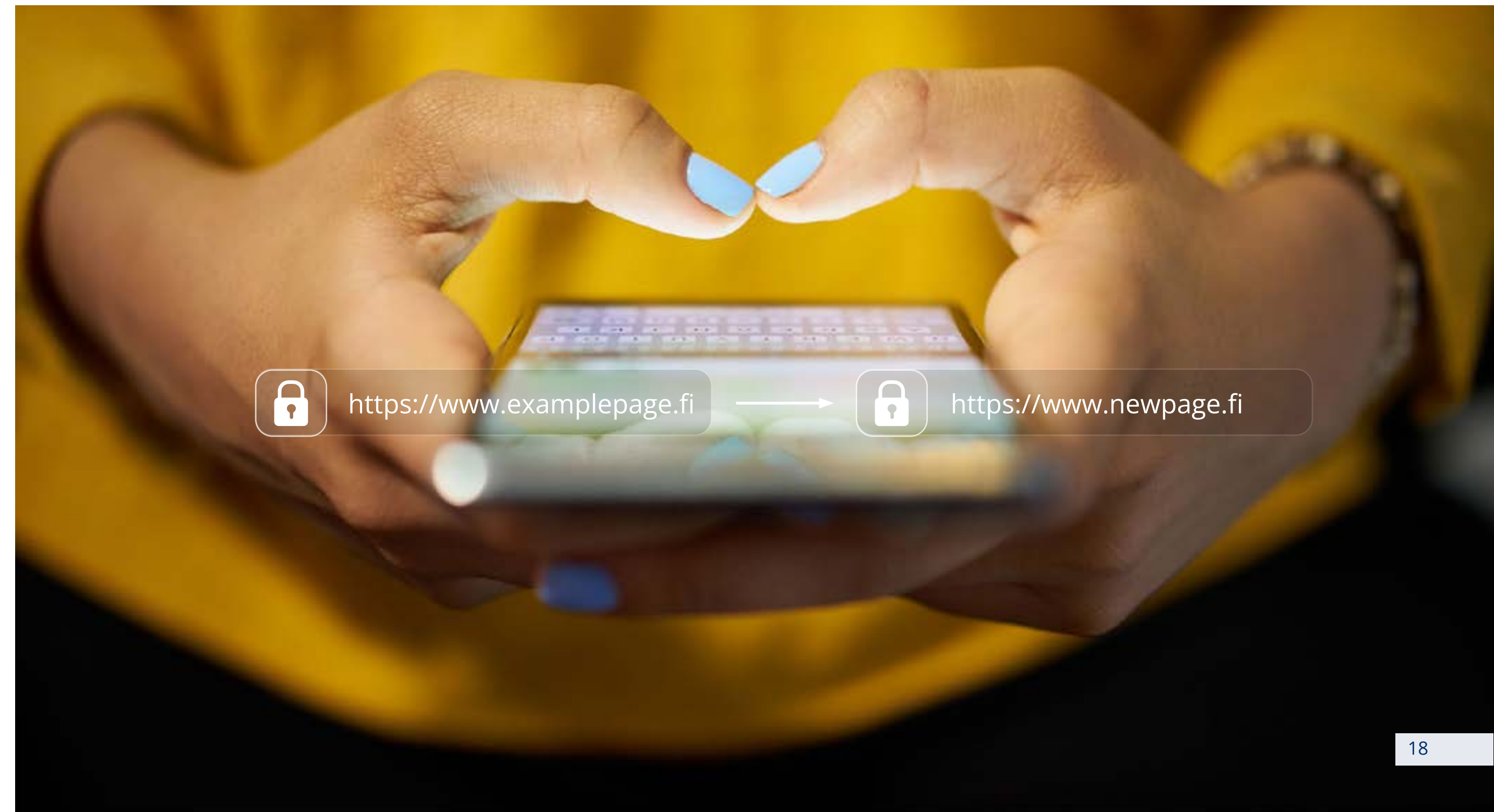
Product identification and specifying data

Due to product identification, the GS1 2D code, like the EAN barcode, must have at the very least the GTIN of the product, but for example the following specifying data can be also included:

- batch number
- serial number
- best before date
- use by date.

The data included in the GS1 2D code in addition to the domain depends on the needs. Most consumer engagement use cases are related to product-level information at the most specific, meaning that the product-specific GTIN is a sufficient level of individualisation and no further specifying data is needed in the GS1 2D code itself. From the perspective of consumer engagement, this means that the company can use the GTIN included in the GS1 2D code to steer the consumer to content related to the product.

When a batch number is added to the code, the consumer can be steered to information related to the specific production batch. This can be helpful for example in communications related to product recalls.

Serial number level codes enable communication specific to an individual product. However, in the case of foodstuffs this can make content management complex because, in the case of recalls, the redirections would need to be made for the serial numbers of the entire batch.

In accordance with the GS1 Digital Link standard, the order of the data content included in the GS1 2D code matters. In practice this means that the order of the identification data of the code progresses from the more general to the more specific (e.g. GTIN > batch > serial number). In addition, the data content also makes use of existing GS1 Application Identifiers. These define the significance of the data content in order for different systems and applications that read and interpret the code can utilise the data. You can find more information about the GS1 Application Identifiers on the GS1 Finland website.

Although the standard allows including a significant amount of data in the GS1 2D code, GS1 recommends that only identification data (such as GTIN and batch number) are included in the code itself and that more specific product information (such as ingredients and origin) are communicated to the consumer using the website that opens by scanning the code. When deploying the GS1 2D code, the needed level of identification should also be considered from a business perspective at different times, as the GS1 2D code allows carrying out consumer engagement flexibly. Increasing the level of identification will always add complexity, which does not provide added benefits to the product manufacturer or consumer in all cases.

Content of the GS1 Digital Link URI

The GS1 Digital Link URI can also contain data other than the domain and product identification.

https://longbrand-name.example.com/gs1-digital-link/productname/01/09506000134352

For example, the above address is valid data content because there is nothing to the left of the GTIN that impacts product individualisation. However, GS1 recommends avoiding extra characters in the data content because the longer it is the larger the GS1 2D code will be, too.

The GS1 2D code contains the GTIN that identifies the product in addition to which it can also include specifying data for a variety of use purposes.

GS1 2D code on the packaging

The location of the GS1 2D code on the packaging matters especially for reading at checkout. During the transition phase, when all retail actors are not yet ready to read GS1 2D codes at checkout, the packaging must still also have an EAN barcode. When the packaging has both a GS1 2D code as well as an EAN barcode, they must be located close to each other for reading at checkout.

GS1 recommends locating the GS1 2D code within a 50 millimetre radius of the centre of the EAN barcode. This allows the checkout operator or consumer not having to know which of the codes must be read at checkout. If the GS1 2D code includes other data in addition to the GTIN, the barcode

reader of the checkout can be programmed to primarily transmit the data of the GS1 2D code to the checkout system, ignoring the EAN barcode next to it.

In many packaging, the EAN barcode is located at the back or even at the bottom of the product. These area not ideal locations from the perspective of consumer engagement. From this perspective, locating the GS1 2D code on the front of the packaging should be considered in order to make it easier to notice on a store shelf, for example.

A significant benefit of the GS1 standards is that they are open. This means, among other things, that the GS1 2D code labelling can be created using various barcode generators found online for free or using the most common labelling software without any extra fees.

A product-level GS1 2D code that only includes GTIN-level individualisation can be pre-printed on packaging, just like an EAN barcode. GS1 2D code that include batch and date information must be printed in connection with production, i.e. on the production line. Codes with serial numbers can be printed onto packaging in advance, but using them will usually require that the codes of the packages that end up in distribution are activated on the line.

QR Code
(GS1 Digital Link URL)
X dim = 0.495 mm
(0.0195")

9 521207 311504 >

EAN-13 X dim = 0.33 (0.0130")

max 50 mm

Location of the GS1 2D code on the packaging

After the transition phase one code on the packaging is enough! In this case, the GTIN of the product must be indicated below the GS1 2D code in legible numbers.

Structure of landing pages

The GS1 2D code offers the opportunity of steering consumers from the product packaging directly to the desired online content. At the most simple, this can mean an already existing product information page on the company's website. In this case, deploying the GS1 2D code does not require the creation of new online content. In order to ensure scalability and responding to changing data requirements, creating product-specific landing pages optimised for mobile devices should be considered. These allow easily directing the consumer to product-related content. This way, for example, data required to be shown to the consumer by new legislation can be made available via the GS1 2D code and the landing page.

The landing page can be implemented as a so-called microsite. A microsite is an individual web page or a small cluster of pages which are meant to function as a discrete entity or within an existing website and which may contain links back to the main site. The microsite can have its own domain or it can use a subdomain of the main site.

In the attached image, you can see examples of existing implementations with a scalable landing page, accessible via a GS1 2D code. The company can implement the landing page according to its own needs and brand image.
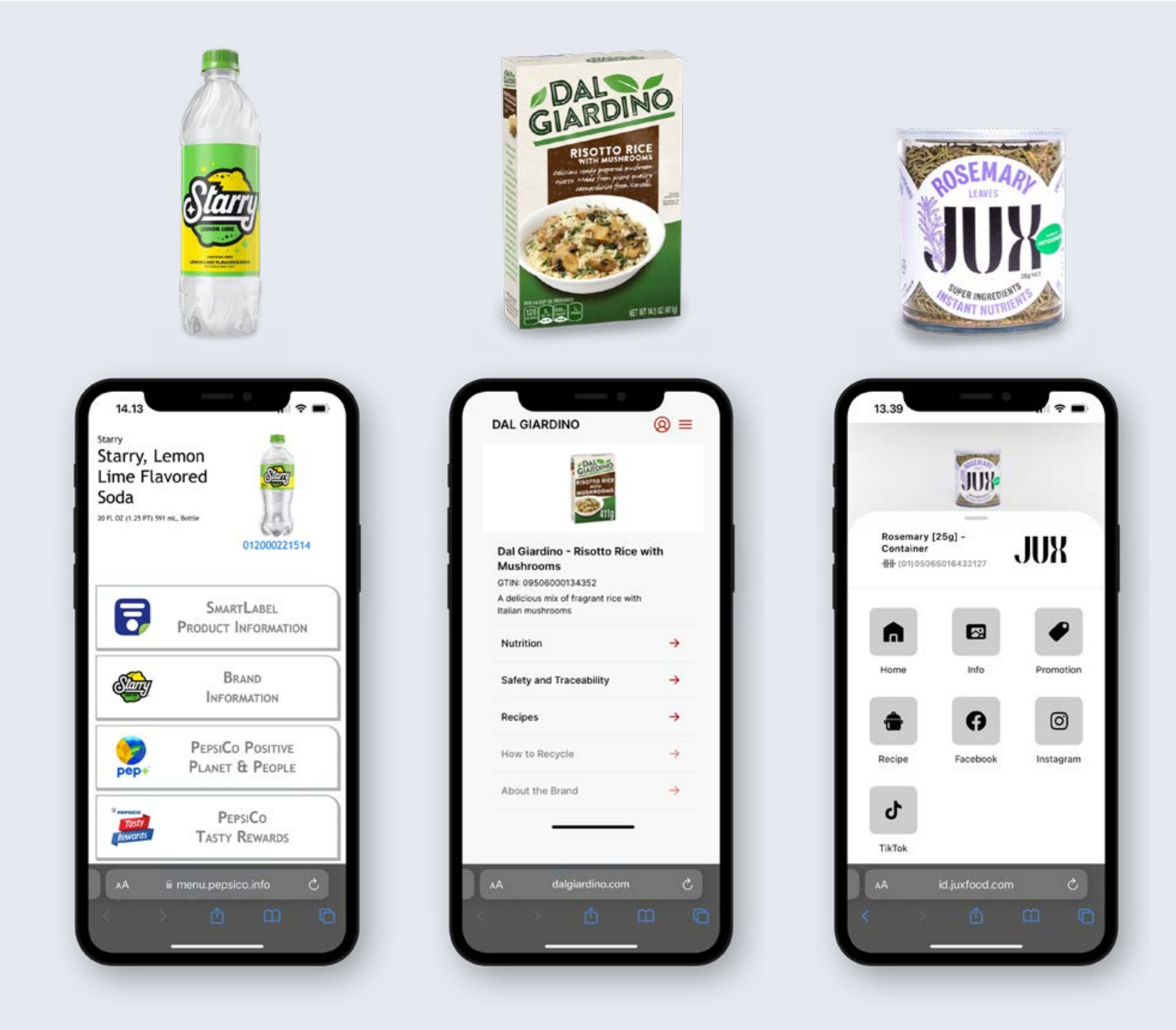
Examples of landing pages.

Marketing the GS1 2D code

When adding GS1 2D codes onto packaging, it should also be considered how you can get consumers interested in the product to scan the code. First, the codes should stand out from the packaging. Consumers should also be engaged and instructed. For example, you could highlight the ease of scanning the code and quick access to product-related additional information. However, you should note that the message should remain relevant even if the content accessible via the code is changed. In other words, the message should be sufficiently generic, such as "Read more by scanning the QR code".

Consumers are more likely to scan a GS1 2D code if it offers them added value. That is why the content accessible via the code should be interesting and offer additional information that is not already available on the packaging. This could include special offers, guides, videos or other beneficial content specific to the product in question. The manufacturer can also provide more in-depth information on the product, for example regarding its production process, origin or sustainability.

By connecting the physical product online, the GS1 2D code offers the opportunity to effectively steer consumers to desired content. The Internet and social media offer limitless opportunities for consumer engagement, such as steering traffic toward a consumer purchasing path. The manufacturer can utilise data on visitors coming to their website via the code to further develop their content to match consumer needs. It is important to maintain the content updated and attractive in order for consumers to utilise it more often than just a single time.
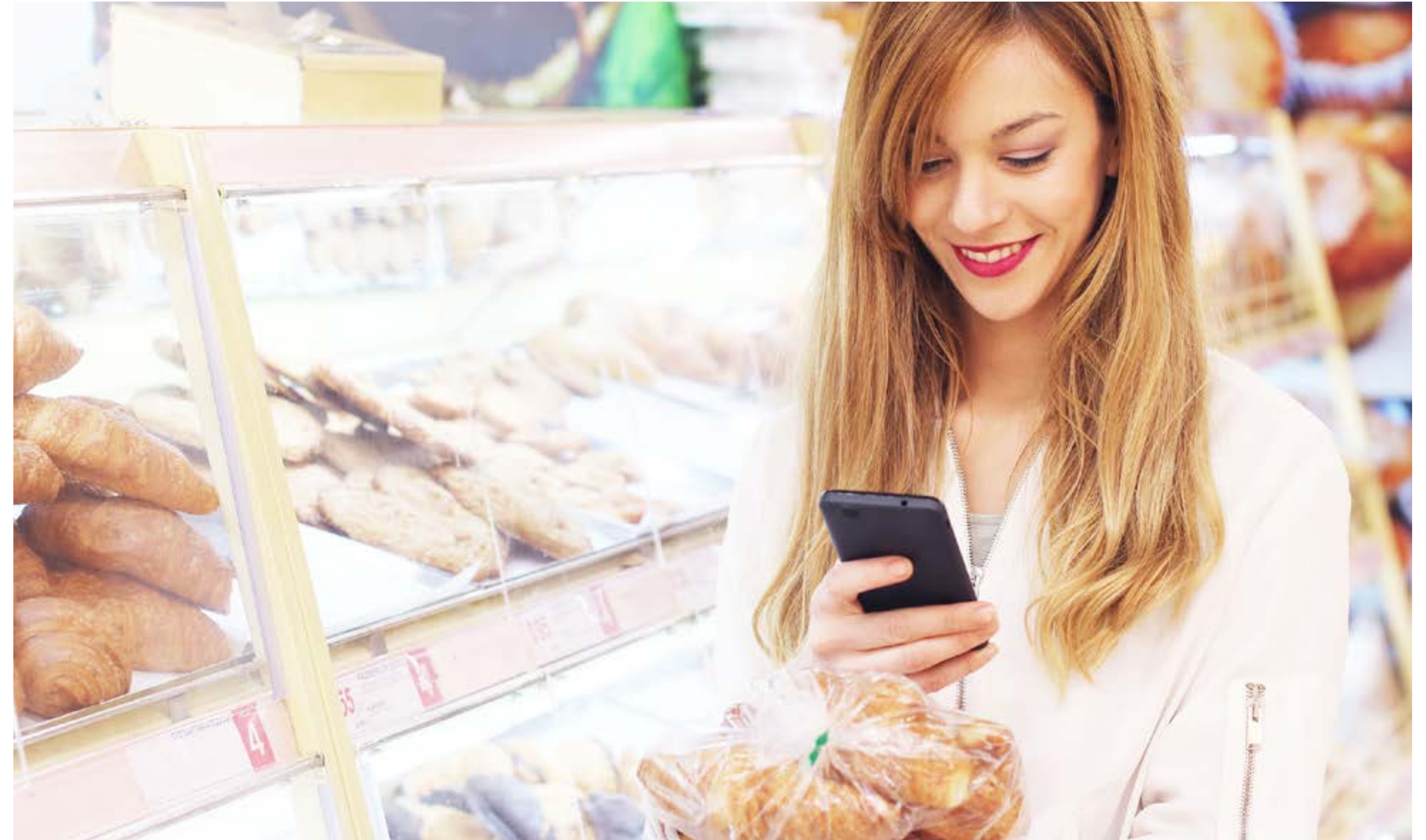
Presenting the GS1 2D code on packaging

It is advisable to use marketing to engage consumers to scan the code. In addition to standing out from the packaging the code should offer the consumer:

- more information
- added value or benefit
- relevant and up-to-date content
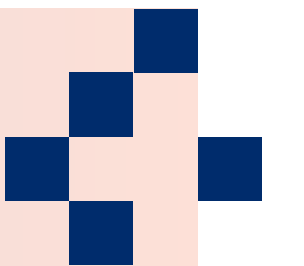
Operating model deployment and roadmap

The deployment of the GS1 2D code should be broken down into steps in order to make the process easier to organise and carry out. This step-by-step development ensures that companies do not need make large investments outright in order to deploy 2D codes and that the resources, development and investments can be carried out in a planned manner, guided by the company's own needs. Of the identified use cases of the GS1 2D code, consumer engagement is the easiest to implement because it provides the opportunity to experiment and develop the concept lightly.

Implementing product-level consumer engagement using the GS1 2D code requires fairly small changes to the current state. If the company does not have the need for batch-specific labelling due to other processes, from the consumer engagement perspective they should start the development from the product level. This way, they do not immediately have to change production lines or invest in dynamic in-line printing, but rather the GS1 2D codes can be pre-printed onto the consumer product packaging, same as the current EAN barcodes and other data featured on the packaging.

Many companies already have plenty of product-related information targeted to consumers on their websites. The GS1 2D code also allows utilising this existing content by providing consumers easy access to the already produced content. Deployment of the GS1 2D code does not limit the kind of

content each company can offer to consumers related to their products, but this is entirely dependent on the company's own goals. They key questions to consider in the deployment of the GS1 2D code are the needs of the company and the required tools and changes in procedures.

Many companies already use QR codes for marketing purposes and changing them to be compliant with the GS1 standard is not a very big change. QR codes already direct to specific content on a company's website. Changing the data content to comply with the GS1 Digital Link standard makes them more versatile. The code printed on the packaging is no longer dependent on the specific page, but rather the content it leads to can be changed according to need using redirections. This also creates readiness to adopt other

Stepwise development according to company needs and resources:

1. **Piloting and testing.** Product-level marketing using existing content.
2. **Creation of a landing page.** Consolidating and creating content.
3. **Development of consumer engagement.** Data for analysis and to support product development.

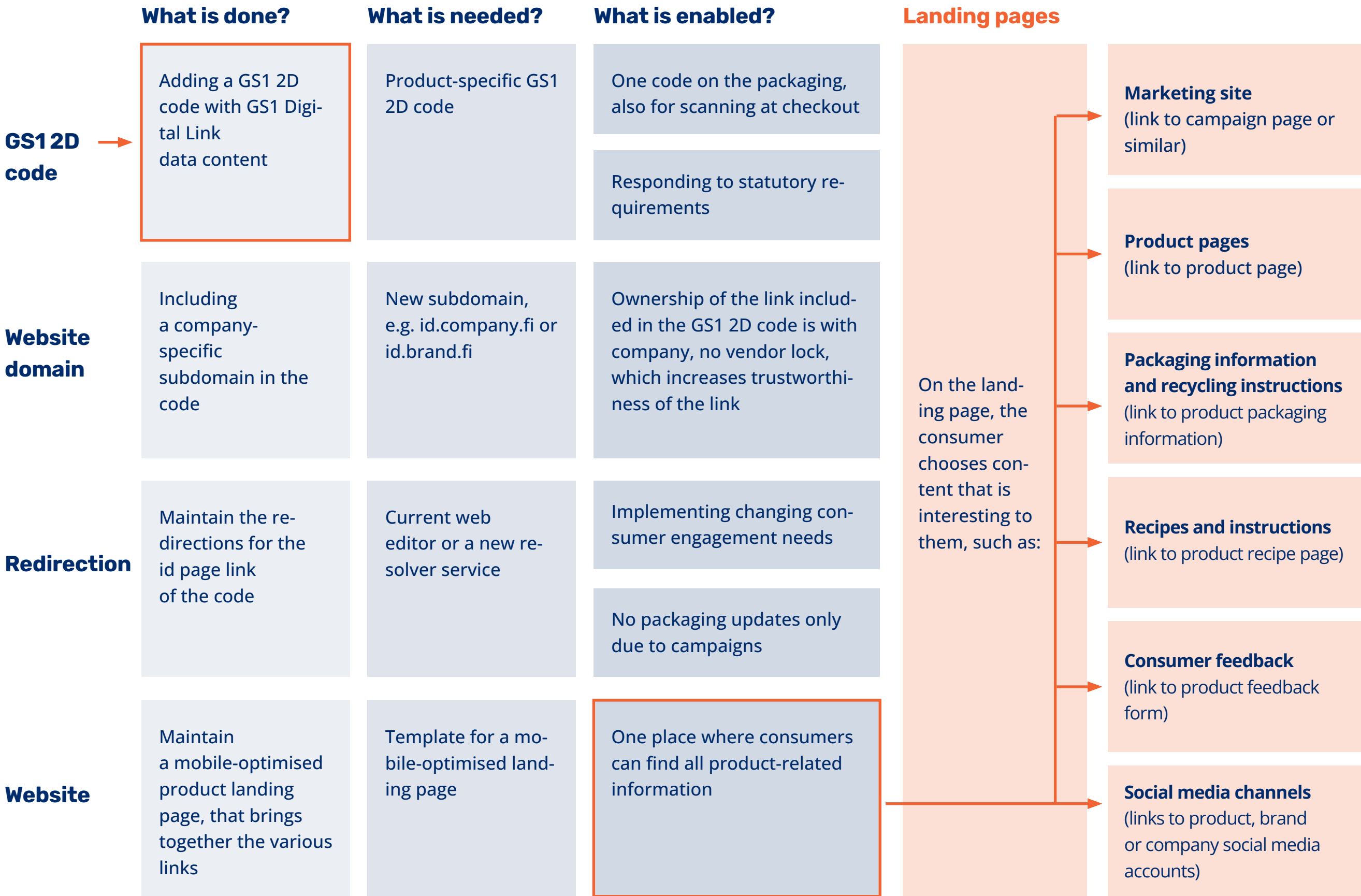use cases of the GS1 2D code, such as scanning the code at checkout.

The GS1 2D code can be deployed in consumer engagement, starting with a smaller number of products and then assessing expansion based on experiences of this first phase. Launching a new product and carrying out a packaging update are examples of situations that offer a natural time to start using the GS1 2D codes. In these contexts, the packaging reform required by adding the code does not incur any additional benefit, but the deployment can be implemented as a natural part of the product life cycle.

Utilising the landing page

Utilising the landing page allows consolidating various content related to the product, its use, packaging and marketing to be shown to the consumer. This way the consumer can choose which content is of interest to them according to the product or need. A landing page also makes it easy to add, modify or remove content as necessary. This makes it easy to respond to factors such as changes in statutory requirements and consumer needs. Consumer needs and interests should be monitored using website analytics.

Users are steered directly

A GS1 2D code with data content that complies with the GS1 Digital Link standard directing to the landing page

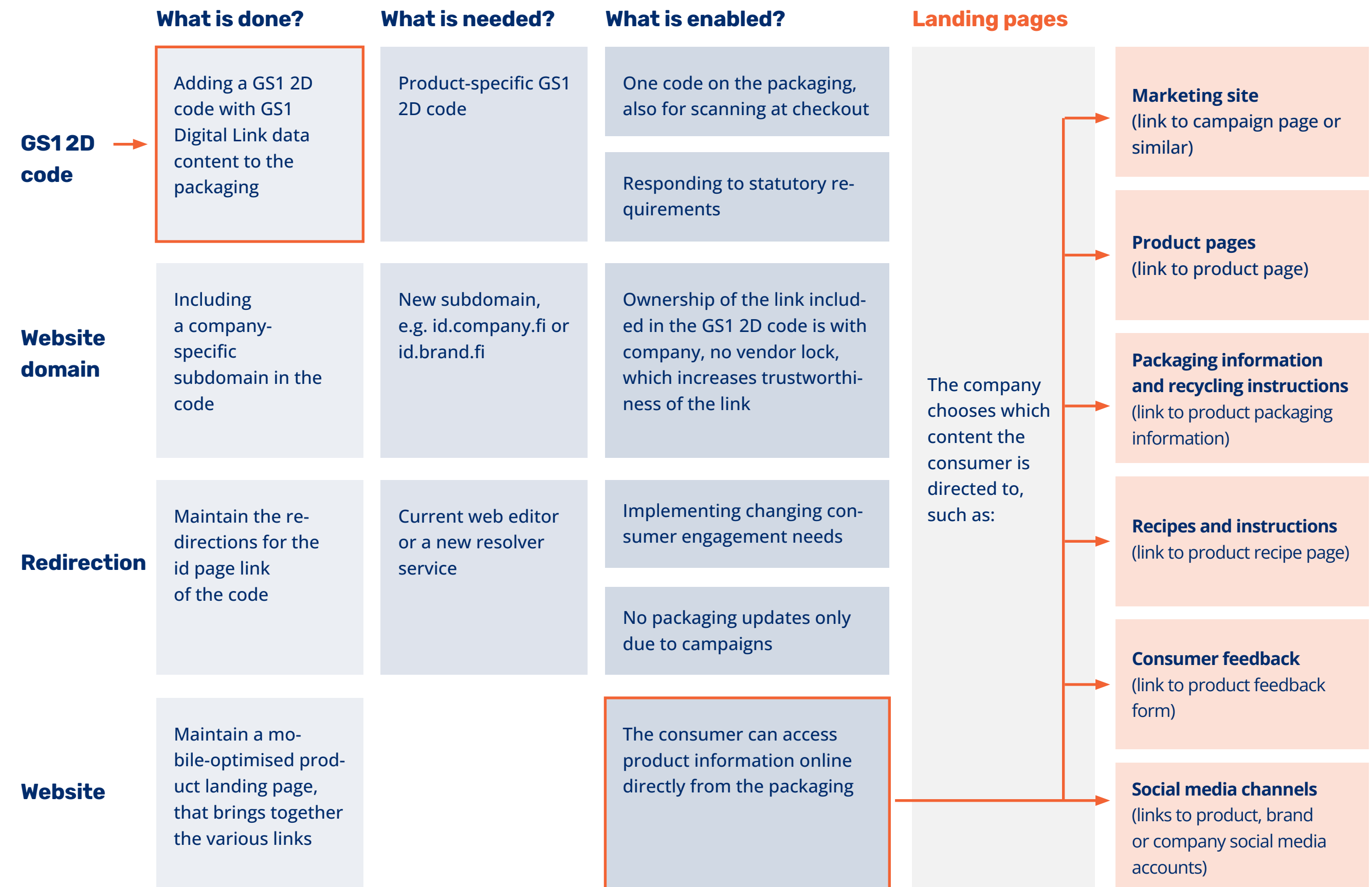|	What is done?	What is needed?	What is enabled?	Landing pages	
GS1 2D code	Adding a GS1 2D code with GS1 Digital Link data content	Product-specific GS1 2D code	One code on the packaging, also for scanning at checkout		**Marketing site** (link to campaign page or similar)
			Responding to statutory requirements	On the landing page, the consumer chooses content that is interesting to them, such as:	**Product pages** (link to product page)
Website domain	Including a company-specific subdomain in the code	New subdomain, e.g. id.company.fi or id.brand.fi	Ownership of the link included in the GS1 2D code is with company, no vendor lock, which increases trustworthiness of the link		**Packaging information and recycling instructions** (link to product packaging information)
Redirection	Maintain the redirections for the id page link of the code	Current web editor or a new resolver service	Implementing changing consumer engagement needs		**Recipes and instructions** (link to product recipe page)
			No packaging updates only due to campaigns		**Consumer feedback** (link to product feedback form)
Website	Maintain a mobile-optimised product landing page, that brings together the various links	Template for a mobile-optimised landing page	One place where consumers can find all product-related information		**Social media channels** (links to product, brand or company social media accounts)

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to the desired content

Creating a separate landing page is not mandatory and the standard does not require it. A lighter approach is to start by utilising already existing content related to the product, such as a product or marketing page. In this case, the redirection from the GS1 2D code is pointed directly to the content page and the consumer is shown the content chosen by the company.

The operational model

> **Changing a marketing QR code into a GS1 2D code is a beneficial change that can be carried out smoothly and which can provide increased effectiveness to the use of existing content, too.**

GS1 2D code with GS1 Digital Link data content directs straight to the content

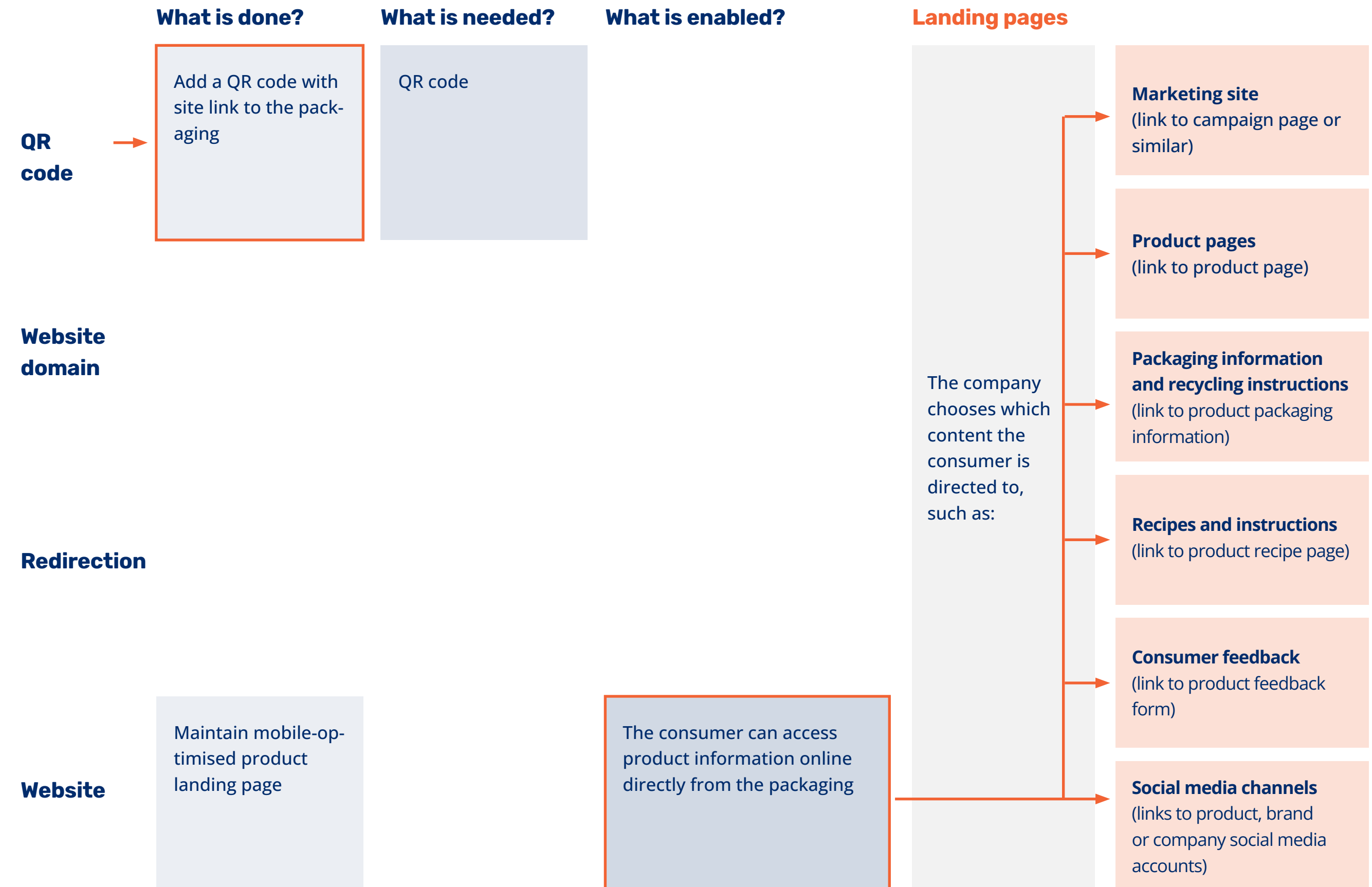|	What is done?	What is needed?	What is enabled?	Landing pages	
GS1 2D code	Adding a GS1 2D code with GS1 Digital Link data content to the packaging	Product-specific GS1 2D code	One code on the packaging, also for scanning at checkout		**Marketing site** (link to campaign page or similar)
			Responding to statutory requirements		
Website domain	Including a company-specific subdomain in the code	New subdomain, e.g. id.company.fi or id.brand.fi	Ownership of the link included in the GS1 2D code is with company, no vendor lock, which increases trustworthiness of the link	The company chooses which content the consumer is directed to, such as:	**Product pages** (link to product page)
					Packaging information and recycling instructions (link to product packaging information)
Redirection	Maintain the redirections for the id page link of the code	Current web editor or a new resolver service	Implementing changing consumer engagement needs		**Recipes and instructions** (link to product recipe page)
			No packaging updates only due to campaigns		
Website	Maintain a mobile-optimised product landing page, that brings together the various links		The consumer can access product information online directly from the packaging		**Consumer feedback** (link to product feedback form)
					Social media channels (links to product, brand or company social media accounts)

of the current QR code

Currently QR codes are often created in such a way that it will lead the consumer directly to a specific campaign site or product page. A QR code without data content compliant with the GS1 Digital Link standard cannot be used for purposes such as reading at checkouts even in the future. If the campaign site, including its domain, is created specifically for only that one campaign, there will no longer be any relevant content to show the consumer once the marketing campaign has ended. For the purpose of the following campaign the codes on the packaging must be changed.
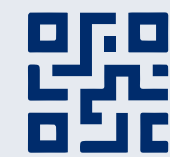
Unlike a pure marketing QR code, a GS1 2D code can be used for transmitting information in the supply chain and at checkout, in addition to consumer engagement.

QR code
directs straight to the content

	What is done?	What is needed?	What is enabled?		Landing pages
QR code	Add a QR code with site link to the packaging	QR code		The company chooses which content the consumer is directed to, such as:	**Marketing site** (link to campaign page or similar)
					Product pages (link to product page)
Website domain					**Packaging information and recycling instructions** (link to product packaging information)
					Recipes and instructions (link to product recipe page)
Redirection					**Consumer feedback** (link to product feedback form)
Website	Maintain mobile-optimised product landing page		The consumer can access product information online directly from the packaging		**Social media channels** (links to product, brand or company social media accounts)

Consumer engagement with a 2D code currently and in the future

Currently

Create a QR code for a website, e.g. product or campaign site.

Add the code to the product packaging. A separate EAN barcode is needed for checkouts during and after the transition phase.
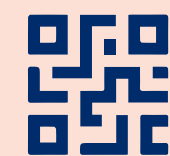
When the consumer scans the code, they are taken to the chosen product or marketing site.
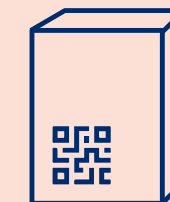
Changes to marketing pages must also be managed from the perspective of packaging. Depending on the used domain, as campaigns change the packaging and the codes on them may have to be changed.
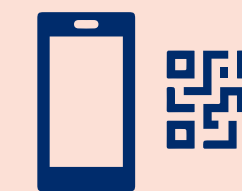
Future

Create a GS1 2D code with data content that complies with the GS1 Digital Link standard.

Add the code to the product packaging. An EAN barcode is required during the transition phase. After the transition phase, a single GS1 2D code on the packaging is enough.

When a consumer scans the code they are redirected to a landing page from where they can move to the content of their choosing.

Changes to the marketing site can be managed using redirections, **removing the need to change the product packaging and codes.**

Deployment phases

	Specifying commitment and needs	Choosing deployment method	Consolidating content	Changes to packaging	Changes to systems	Marketing and analytics
Directing straight to content	Defining objectives	The domain or subdomain and data content included in the code	Creating the content page or selecting an existing page	Locating the code near the EAN barcode and so that it is visible to the consumer	Creating the redirection with a web editor	Building analytics and re-marketing for the content page
	Product selection	Tools required for redirection	Possible changes to the existing pages	Including a persuasive message on the packaging		Using the code in marketing the product
Direction to the landing pages		Creating the landing page	Mobile-optimised landing page to consolidate various links		Linking content to the landing page	Building analytics and re-marketing for the landing page

Do you need help in deploying GS1 2D codes?
Our experts would be glad to help.

Key terminology

Business terminology:

Food company
Typically a company manufacturing products, but can also be an importer that supplies products to retail groups

Batch number
Production batch specific identifier defined by the manufacturer

Logistics centre
A central warehouse where products are stored and distributed in a centralised manner to stores and distribution centres

Date data
The product's use by or best before date

Location
Individual store or restaurant which the consumer visits

Production plant
An industrial location in which products are manufactured

Trade item
A product or service manufactured/supplied by a food business

Product group
A group of similar products

Online store
A marketplace operating on the Internet

Technical terminology:

2D barcode
A two-dimensional matrix barcode that can be present more information in less space compared to traditional barcodes

Subdomain
A section apart from the main domain that is used for a specific use alongside the main domain

Digital dissemination of information
Sharing information between parties of a value chain in digital format using interfaces

Domain
A domain is a unique address on the Internet, which defines and sets apart a specific website from others

Physical identification
Identification and individualisation of physical products in the supply chain using barcodes

GLN (Global Location Number)
GS1's identifier of a party and location that makes it easier to identify the company, its internal functions or places of business

GS1 Digital Link
A GS1 standard that enables digital interaction using a physical product

GS1 Application Identifier
A standardised way of presenting additional information related to products and packaging

GTIN (Global Trade Item Number)
A product identifier used for providing globally unique identity to products and packaging

Landing Page
A web page to which a user is directed with the objective of having them carry out a desired action, such as completing a purchase or filling in a form

Microsite
An individual web page or a small cluster of pages which are meant to function as a discrete entity or within an existing website and which may contain links back to the main site

Resolver
A solution that enables managing redirections related to several different products using a single barcode

URI (Uniform Resource Identifier)
A unique identifier of a resource on the Internet, such as specific information (URL, Uniform Resource Locator), like a website

Redirection
Directing a website visitor from one address to another

Sources

Links

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