GS1 Japan

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Pilot Test Report

Dynamic pricing implemented using GS1 DataMatrix

First pilot test of 2D at POS in Japan

In February 2023, a pilot test was conducted in Japan to implement efficient dynamic pricing. The test was the first ever performed in Japan to scan GS1 2D symbols (GS1 DataMatrix) at POS cash registers.

Pilot test overview

The pilot test was conducted as part of the 'FY 2022 Infrastructure development project for improving efficiency and creating added value in distribution and logistics (to create case studies on improving supply chain efficiency and reducing food loss using IoT technologies)', which was commissioned by the Ministry of Economy, Trade and Industry.

The purpose of the pilot test was to verify the effect that inventory management using products' expiration date and dynamic pricing will improve supply chain efficiency and food loss reduction.

Pilot venue
Maizuru Carrot Hamatama Store
 (Karatsu City, Saga Prefecture)

Pilot dates
24 January to 26 February 2023 (34 days in total)

Target product
Bread 25 SKU

Companies participating in pilot
- Imamura Corporation,
- SATO Holdings Corporation,
- Nishinihon Ishida Co., Ltd.,
- Maizuru Department Store Co., Ltd.,
- The Japan Research Institute, Limited

Expected benefits in this Pilot test

■ **More efficient retail operations, solving labour shortages**

Automatic price discounting of products was implemented by using a dynamic pricing system* and electronic shelf labels. Verified what degree it was possible to reduce the large workload involved in attaching price reduction labels.

■ **Reduction of food loss and increasing sales**

So far, the reduction of food loss has been achieved through the manual process of applying price reduction labels. We measured whether the same food loss reduction rate could be achieved by automated system. It was also investigated whether the implementation of new price discounting in accordance with consumer behaviour had the effect of increasing sales.

■ **More advanced production estimates at food manufacturers**

Verified whether a higher level of production forecasting could be implemented by utilising sales data by expiration dates and discount rate.

How dynamic pricing is implemented

1. **GS1 DataMatrix labels and group labels are placed on products.**

   Once the products that are the subjects of the pilot test have been delivered in the store, GS1 DataMatrix label and group label are attached on the products.

   A target bread product has a group label on its package front and a GS1 DataMatrix label on its package back.

Group Label	GS1 DataMatrix with GTIN and expiry date

*In this pilot test, the Sato Dynamic Pricing Solution (SDPS) was used.

2. The system automatically reduces prices.

- The prices of the products are set by the POS system based on their expiration dates.
- The price of each group of products is displayed on the electronic shelf label.
- And the shelf label is changed automatically in accordance with the system at pre-determined times (before store opening, and at 1 p.m. and 4 p.m.).
- At the POS cash registers, the price of each group of products is also changed automatically at pre-determined times.
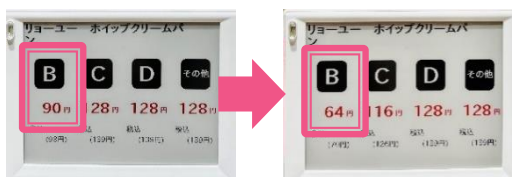
The price is changed automatically at 1 p.m.

3. Products are selected

Consumers choose products according to their own needs. (e.g., a discounted product with a short expiration date if it is to be eaten soon, or a regular-priced product with a long expiration date if it is to be eaten at a later date).

This allows precise price changes that are not possible with traditional price reduction labels, and is advantageous for both the store and the consumer.

Products with the electronic shelf labels

4. Payment made at a POS cash register.

GS1 DataMatrix labels are scanned at a cash register as well as EAN symbols. The prices of target products are automatically calculated based on their expiry dates.

GS1 DataMatrix compatible POS cash register

Learning and Result

■ Reading GS1 DataMatrix at POS Cash Register and Cashier Handling

This was the first instance in Japan where a POS cash register was equipped to read the GS1 DataMatrix. Consequently, the POS system had to be modified in preparation for this pilot test. The system, which had previously identified products solely by GTIN (EAN symbol), faced challenges in identifying products by both GTIN and expiration date, as well as adjusting prices based on this data.

Fortunately, the existing POS cash register scanners were already equipped to read 2D symbols, eliminating the need for scanner replacements. Efficient scanning was achieved by adjusting the scanner system to comply with the GS1 element string syntax.

Shortly after the pilot commenced, some cashiers experienced difficulties with the readable distance and the angle required to effectively scan 2D symbols. However, they quickly adapted, and scanning these symbols was neither more time-consuming nor more challenging than scanning EAN symbols.

■ Improved operational efficiency and reduced labour costs
Pilot Test Result

A total of **1,682** products were sold at a discounted price during the pilot period. The average number of discounts for these 1,682 items was 1.375 times. If the traditional discounting process is calculated as 10 seconds per discount for one product, this means that **6.42 hours were saved** in total.

Preliminary Calculation (for all bread)

The pilot test covered 10% of the bread sold in this store. This means that automating the discounting of all bread using this method would **save 57 hours per month** (6.42 hours x 100% / 10% x 30 days / 34 days). In case the wage is $15 per hour, **a cost saving of $855 per month** can be achieved.

■ Food loss percentage

The supermarket had previously had a low food loss rate of less than 1%. With the current pilot test, the food loss rate was initially higher than it had been before the pilot. This was because customers did not understand the process of checking prices by looking at the electronic shelf label. Therefore, various efforts were made to improve the consumers' recognition. As a result, the food loss rate was improved to the same level as before the pilot test.

"Detailed discounting, which was not possible before, has been achieved. If this method is implemented, it will transform the way we work."

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