GS1 - an international non-profit organisation is active in 150 countries and has been supporting trade since its inception. To this end, the organisation implemented the bar code, known and used globally and considered by BBC as one of the 50 inventions that had the biggest impact on the creation of modern economy. GS1 standards help businesses identify, gather and share product information. Contemporary customers demand quick, accurate and complete information about products, which they can achieve thanks to the access to traceability system. The GS1 system allows trade partners to effortlessly cooperate and share traceability information throughout the entire supply chain.

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Managing traceability using GS1 standards at a producer of ultra fresh products.

Introduction

Sushi Factory from Robakowo, a small town near Poznań, is the leading producer of sushi in Poland and one of the largest in Europe.

The company delivers their products to several retail networks, mostly with their own brand, but also with their clients' brands. The company is growing rapidly and keep looking for solutions in the area of production and logistics processes. Managing traceability is an element present both in manufacturing and in logistics, consequently having an immense impact on the efficiency of processes in these areas. Traceability is the ability to track, or follow, the raw material's or product's path upstream and downstream in the supply chain. This means the possibility of identifying / acquiring all data about raw materials and processing stages they will be subjected to, until finished goods are achieved and the other way around - the possibility to track information about raw material(s) used to make such goods on the basis of information about them.

The project's objective

In 2018 Sushi Factory began cooperating with the Institute of Logistics and Warehousing and with GS1 Polska with regard to a traceability audit.

The developed recommendations and guidelines are based on the application of GS1 standards and adaptation to several traceability related process solutions.

The project's main objective was to develop a concept depicting a method of managing traceability, from the batch of raw materials, through the batch of finished goods.

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The identified problem

Pursuant to the act on sanitary conditions of food and nutrition, all companies active in the food market are obligated, since 2004, to use the HACCP system. However, from the perspective of a company manufacturing ultra fresh goods, this is decidedly too little to be competitive and to satisfy the market's expectations. This is why Sushi Factory has BRC and IFS certificates that confirm their food's high quality and safety. An efficient and, most importantly, effective traceability system is an element of crucial importance that addresses food safety concerns.

Sushi Factory made a decision to hold an audit mainly because of the need to improve the traceability system, or rather to upgrade it. The company's main problem was manual data collection during the production and warehousing process and consequently their further processing, also manually, consisting in uploading to the IT system. In other words, the project lead to the creation of a coherent concept of how the IT system can fulfil traceability in a business with the use of GS1 traceability standards.

Suggested solutions

Several assumptions were taken for the study, which allowed the effective introduction of traceability management in Sushi Factory.

The most important of them are:

- the application of GS1 standards in the area of identification of packaging units at reception stage, collection for production and release (shipment preparation),
- unification of labels on packaging:
  - GTIN (Global Trade Item Number) in the EAN-13 code – unit packaging,
  - GTIN + batch number + date Best before + net weight in GS1-128 code – collective packaging,
  - GS1 logistics label GS1 at release, with SSCC number (Serial Shipping Container Code) – logistics unit,
- unification of graphical layout of the labels.

However, to satisfy these requirements initial guidelines had to be developed, which would include a set of identification data, along with the type of marking (code symbols) for individual packaging units. Additionally, basic logic assumptions related to handling processes by the IT systems, namely the functionality of the system, were recommended.

The most important of them include:

- the ability to handle GS1 identifiers and their
- record of connections between packaging forms correct interpretation by the IT system, and the data describing them (e.g. there are 80 collective
- the ability to generate GS1 identifiers for individual packaging on a pallet with a GTIN 1 number, of which packaging forms (GTIN, SSCC) each consists of 12 unit packaging with a GTIN 2 number
- generating GS1 labels on the basis of system data, and production batch ABC123, with the Best before date until: 28.11.2018).

The study

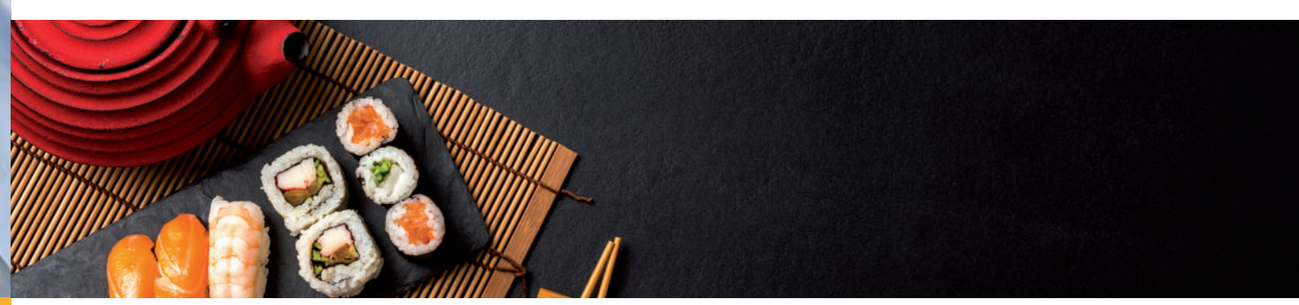
In late April and early May 2018, the Logistics and Warehousing Institute conducted a process-oriented traceability study in Sushi Factory, also called a traceability audit, for the entire production process, but with special attention paid to the area of warehousing and supplying raw materials for production, release from production and final external release.

The process analysis allowed to compare the current and potential efficiency of the selected processes after the introduction of changes resulting from the application of GS1 standards and automatic identification (ADC). The results of the study form a basis for evaluating benefits from the planned changes, even before implementing them.
The study performed at the company were based on the standard BPMN 2.0. described in ISO/IEC 19510, and also on GS1 GTS criteria (Global Traceability Standard). BPMN (Business Process Model and Notation) is a tool for describing business processes in practically any field. 5 processes were analysed during field trips to the sushi maker's plant:

- receiving deliveries,
- release to production buffer,
- collecting raw materials for production,
- production,
- handling the issue of products.

An example of a label on a pallet with finished goods made by Sushi Factory

Source: own work



As is models of the current state were created on this basis. Next, places with potential for optimization were identified, where GS1 standards could be implemented and where selected tasks could be automated.

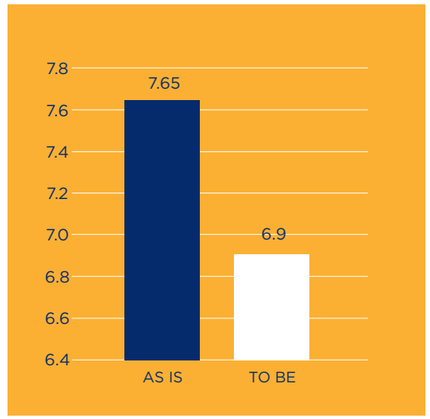
The subsequent step was to propose solutions related to identification and recording data relations in the IT system. As agreed with the audited company's personnel, target processes taking into account the application of GS1 standards were designed, along with changes resulting from marking the products, collective packaging and logistics units. Maps in the final, "to be" version were created afterwards. Ultimately, using comparative simulations, the optimization potential forming a basis for making further strategic decisions by the company's board was determined.

The study's effect - traceability aspect

As part of the traceability audit several potential risks were identified, stemming from the failure to apply GS1 standards and performing manual operations for the process of tracking the origin of specific production batches. All these risk are related to manual introduction of the data into production documents, but also to generating and supplementing the data manually in incoming and outgoing warehouse documentation.

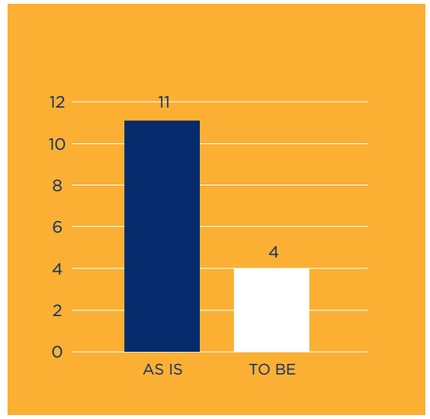
Thanks to the parametrisation of the audited processes, we managed to measurably determine what would happen if the company introduced the recommended changes. By comparing the KPIs (Key Performance Indicators) of processes pertaining to the current situation, AS IS, and the target situation, TO BE, we could examine the accurate values and benefits brought by the changes. The following can be named among the most important KPI changes:

- **with regard to delivery acceptance** – the application of ADC solutions and GS1 standards will eliminate the waiting time for the so-called “opportune moment”, during which a delivery acceptance document is manually generated, and the task itself will last precisely as long as it is needed to scan a GS1 label in acceptance and printing the document in the IT system. In other words, the document will be created within the system, while the warehouse employee is physically receiving the goods::
  - **KPI:** the average time of handling the reception of a delivery was 7.76 hours monthly in the AS IS model (per employee) and will take 6.9 hours in the TO BE model.
  - **KPI:** employees’ engagement, in percent, in a given task (labour intensity) - in the AS IS model, the engagement is at 29.79% and at 29.5% in the TO BE model.



The average time of handling raw material reception in Sushi Factory

- **in the process of releasing raw materials to the production buffer –** the application of the described recommendations and changes will result in picking the raw materials subject to an MM document generated by the system; additionally, marking the collection areas with codes compatible with the GS1 standard will significantly speed up and automate the process:
  - **KPI:** the average time of handling the process of issuing raw materials to the production buffer, in the AS IS model, is 95.81 minutes (per one employee) and will take 5.76 minutes in the TO BE model.
  - **KPI:** employees’ engagement, in percent, in a given task (labour intensity) - in the AS IS model, the engagement is at 11% and at 4% in the TO BE model.



Labour intensity in the process of issuing raw materials to the production buffer in Sushi Factory

Source: own work

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Conclusions and summary

The completed simulation analysis lead to the conclusion that the implementation of the proposed solution is going to improve the efficiency of processes related to traceability, mainly at the stage of receiving deliveries, issuing to the production buffer and collecting for production. Apart from reducing the time, labour intensity is going to decrease, which will in turn allow the employee to perform other tasks, since they are less encumbered.

The implementation of solutions based on GS1 standards, and in particular the GS1 logistics label, will allow Sushi Factory to satisfy the expectations of the growing number of retail network buyers in this regard. The automation of processes will not only allow to achieve the demonstrated benefits with regard to receiving and issuing raw materials for productions, but will also reduce the quantity of generated documents in all analysed processes.

There is no doubt that the project's results point to the necessity to modify or replace the existing IT solutions with regard to traceability in order to consolidate the input and output data (pre- and post-production). Oftentimes, this is the most important element of such projects that shows what should be changed and where such changes should lead with regard to the IT system.

Without an effective IT system operating within the traceability area on the basis of GS1 standards and handling traceability management tasks with the application of relations between the data of the traced object (frequently a production batch), it is impossible to achieve a truly efficient traceability system.