GS1 Japan

The Global Language of Business

GS1 Japan Handbook

2015-2016

Message from the President

The economic revival strategy known as “Abenomics” has put Japan on the road to recovery. Thanks in part to the recent economic upswing, there has been a steady growth in the adoption of the GS1 standard in Japan, and total number of member companies has exceeded 131,000. I would like to take this opportunity to express my sincere gratitude to the GS1 community members for their cooperation and support.

Since GS1 Japan joined the former EAN International in 1978, the total number of GS1 Company Prefix licensees has grown to exceed 130,000 today. While pleased with this achievement, GS1 Japan has not been complacent; it recently undertook a major organizational change aiming for further growth and improvement. The restructuring was two-fold: first, operational units structured along technology resources—such as barcodes, EPC/RFID, EDI, and databases—were transformed into industry-based departments. The realignment allows us to provide more tailored solutions, combining the appropriate GS1 standard and services to meet industry- and product-specific needs. Second, GS1 Japan established an organizational structure that promotes closer coordination between its domestic and overseas activities. The Japanese economy, along with that of the rest of the world, is becoming increasingly integrated into the globalization process, and GS1 Japan is committed to playing an active role internationally, developing and submitting its own standardization proposals, forging stronger ties with GS1MOs of other countries, and offering support to member companies operating abroad.

The most notable developments in Japan today are the growth of E-commerce and the heightened consumer awareness for product safety.

The rapid expansion of E-commerce in B2C and C2C, is having a significant impact on commerce. For instance, much attention is being paid to omni-channel retailing, which involves a seamless integration of online and offline marketing, with a growing number of retail and apparel business actively adopting this approach in Japan. Indeed, more than 10% of the companies that registered for a GS1 Company Prefix have responded that they did so to utilize the GTIN in online marketing. In view of this trend, we plan to play an active role in digital commerce in the coming years.

The recurrent food safety issues at home and abroad, such as the distribution of expired or contaminated food, have sparked consumer interest in product safety. Many businesses are now taking steps to address those concerns.

In the healthcare sector, new barcode system was introduced in July 2015 with the goal of implementing traceability and preventing medication errors involving pharmaceuticals.

GS1Japan is currently involved in implementation studies, and promotion activities of the GS1 system that will prove effective in addressing product safety and security issues for multiple companies.

In moving forward, GS1Japan will continue to intensify its efforts to promote the adoption and widespread use of the GS1 system by responding to technological innovation, various business needs, and changing consumer behavior. Finally, I extend my best wishes for the continued success of the GS1 member companies, GS1 MOs, and GS1 Global Office, and look forward to providing greater consumer satisfaction through the GS1 standard.

Hirokazu Hayashi
President
GS1 Japan

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1. BarCodes & Identification

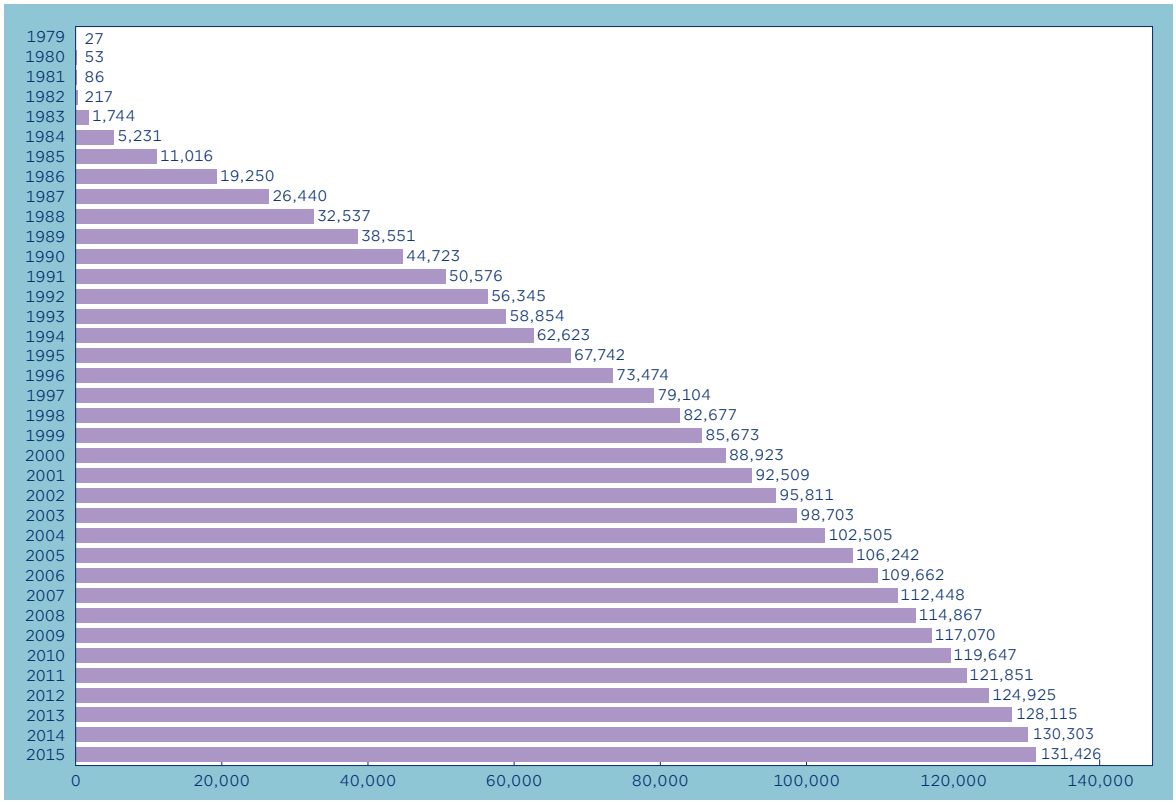
1.1 Overview of GS1 Japan Membership

When Japan became a member of EAN Association (now GS1) in 1978, we were assigned GS1 Prefix 49 and began allocating 7-digit company prefixes to member companies. With the increase in number of member companies, an additional GS1 Prefix 45 was assigned. In January 2001, we began allocating 9-digit company prefix to companies that had less than 50,000 product items at the time of application, while allocating conventional 7-digit company prefixes to companies that had 50,000 or more items. Registration of the company prefix needs to be renewed every three years. GS1 Company Prefixes are allocated to 131,426 companies as of March 2015 (See Fig.1.1-1).
In recent years, there has been a particular increase in small and medium sized companies as well as individuals applying for a GS1 Company Prefix, in order to sell products through online shopping sites such as Amazon and Rakuten, resulting in overall increase in the number of new registrations. Looking at the newly registered companies in FY 2013, the most common product categories handled by these companies were 1) processed foods, 2) audio visual content (digital distribution, CDs, etc.), 3) sundry goods, 4) clothing, and 5) confectionary.
Along with the expansion of online shopping, the number of GS1 Company Prefix allocation will continue to increase.

1.2 Global Trade Item Number (GTIN)

GTIN is the product identifier for trade in retail and other supply chain. By utilizing GTINs, B2B transactions become more efficient, since the need to establish and convert to the companies' internal product codes is largely eliminated. Moreover, the accuracy of the product information shared with business partners is greatly improved.
It is important that each brand owner assigns GTIN correctly to its products per GTIN Allocation Rules so that the product can be unambiguously identified and product information is effectively exchanged between trade partners. In cooperation with various industry organizations, GS1 Japan plans to continue its efforts to spread the use of GTINs, and to ensure their active use by many companies, in order to reduce costs for the entire distribution industry.

Fig. 1.1-1 GS1 Company Prefix allocation



1.3 GTIN Application to Online Sales

GTIN is now used not only for products sold in brick and mortar stores but also for those sold online, including both physical products and downloadable digital products.

1.3.1 GTIN in online music service

In 2005, a service that used the Internet to sell music content was launched in Japan. The system called iTunes Store is run by a wholly-owned subsidiary of Apple Inc.
Since all songs must be controlled globally and digital songs must be synchronized with hard copy products of the same content, iTunes Store manages sales units (both individual songs and albums) by GTIN.
Therefore, the GS1 company prefix is mandatory for registration of songs at iTunes Store.
The allocation of GTIN for digital songs should be proceeded as follows:
When the music content sold in both iTunes Store and CD/DVD are exactly same, GTIN should also be the same. When they have different content (when a promotional video is added for example), a different GTIN should be allocated.
It is certain that the music industry is becoming a great user of GTIN in Japan. Observation of newly registered GS1 Company Prefix by industry thus far shows that the registration of music categories began to increase gradually in 2004 and accounted for 7.5% in 2012.
In Japan, nearly 30 companies, including Yahoo! Japan and Sony Music Entertainment (Japan) Inc., provide music distribution services for personal computers and portable players, and several firms also provide this service for mobile phones. It is expected that online music distribution will continue to spread in Japan in the years ahead.
GS1 Japan will continue to monitor and promote the potential usage of GTIN in this field.

1.3.2 Using GTIN in online sales – Rakuten Ichiba Case Study

Rakuten Ichiba is one of Japan's largest ecommerce platforms and is operated by the Internet services company Rakuten, Inc., which was founded in 1997. Rakuten Ichiba utilizes a business model wherein Rakuten, Inc. serves as an intermediary for companies selling products and consumers purchasing products.

Rakuten Product
With over 40,000 sellers, Rakuten Ichiba holds a 30% share of the online shopping market in Japan (source: Rakuten Ichiba, announcement of financial statements in the fourth quarter of 2012). The number of products available through Rakuten Ichiba is enormous and numerous companies sell the same or similar products through the site. This situation resulted in the launch of Rakuten Product where consumers can easily compare prices and popularity. Rakuten Product requests GTIN when a seller registers a product for sale through the site. Rakuten Product uses GTIN to show the same products sold by different companies on same page. This system allows for easy product comparisons and enables consumers to use Rakuten Product to easily search for the products registered under GTIN. This system also makes it easier for consumers to compare the prices and customer feedback of each shop. Rakuten, Inc. has pushed sellers towards registering GTIN at the time of product registration and as a result has built a database of product information.

Mobile APPs for Rakuten Product
With the growing popularity of smartphones, the number of people who access websites from their smartphones instead of a personal computer is growing rapidly and companies are focusing on websites for smartphones. Rakuten, Inc. launched its Rakuten Ichiba MOBILE app for both iPhone and Android phones. Both

Fig. 1.3.1-1 GTIN allocation procedure

1. GS1 Japan allocates GS1 Company Prefix to musicians.
2. Musicians allocate GTIN -13 to each song and apply to iTunes Store for registeration with GTIN-13.
3. iTunes Store manages their database in 14- digit capacity.

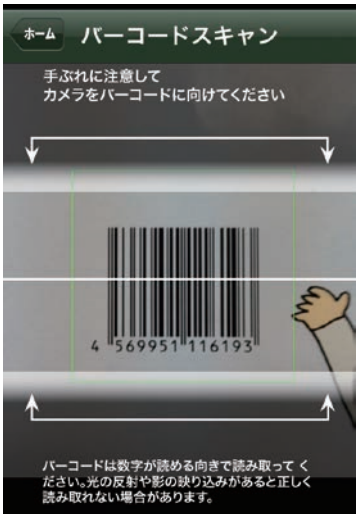
apps allow the user to scan an EAN/UPC using the smartphone's camera to search for products in addition to performing a keyword search. GTIN and the database together realise this scan and search.
Rakuten Inc. is expanding its e-commerce and e-book services into the North and South America, Europe, Asia, and Oceania. Moving forward, the company will look to spread its corporate philosophy of "empowering people and society" with its overseas group and it develops the Rakuten business model on a global scale.

Fig. 1.3.2-1 Rakuten Ichiba MOBILE (sample screen)

1.3.3 Shoppi: GTIN usage for multiple online shopping site

Shoppi is a free application for smartphones (iOS/Android). By reading GTIN printed on a commercial product, the application enables every user to search for and compare prices or other information on various online commerce sites. Although a number of comparison shopping services are available for online commerce and many shoppers already utilize these services, Shoppi can add two extra advantages; ease of retrieval by a simple GTIN scan and usability at anytime and anyplace.
As of August 2013 the application supports about 40 searchable online commerce sites (about 60,000 shops) and has been downloaded 950,000 times. Both figures demonstrate that Shoppi is the most popular domestic barcode application. Most other similar applications only look up several major online commerce sites such as Rakuten and Amazon, while many specialty shops including bookshops, CD stores, toy shops and food stores are accessible via Shoppi. The number of accessible online commerce sites is one of the most important factors for application users because it may provide more search results and increase the chance of finding a cheaper product.
On the other hand, affiliated online commerce sites can expect more visitors and sales by providing merchandise information to Shoppi. For this purpose, they pay an affiliate fee and a certain percentage of the sales derived from using the application. In other words, shops can use Shoppi as a type of online advertising.

Fig. 1.3.3-1 Scans GTIN



How to get the merchandise information with GTIN

When you point your smartphone's camera at a barcode, Shoppi reads the GTIN from the barcode image. Then it uses the GTIN as search key to request the merchandise information from each online commerce site. If the GTIN and the associated information are found in the master database, the online commerce site sends back the information to Shoppi.
The price, inventory, image and other information on the product collected from the online commerce sites are displayed in a list on your smartphone. If the GTIN is not registered in the master database of an online commerce site, the site will be omitted from the list.
Affiliated online commerce sites use the GTIN for merchandise control, but the GTIN is not always registered for every article available in an online commerce site. Amazon sets codes such as GTIN and ISBN for most of their articles, while some other online commerce sites are said to have set the GTIN for not more than half of their items. Therefore, Shoppi cannot always find every article at every affiliated EC site.

Fig. 1.3.3-2 Result for scanning GTIN

Future developments

OPT Corporation operating Shoppi plans to provide a variety of services through barcode applications. For example, a scanned barcode enables one to browse related web pages that describe the details of a DVD, look for price options for game software, or find recipes for a food ingredient. Beyond comparing prices or searching for products, these services may provide more consumer-based advantages.

1.4 Other Identification Numbers

1.4.1 Periodical publications and books

Japanese numbering structure for periodical publications (magazines, newspapers, etc) and books is structured as follows:
The numbering structure for periodical publications (magazines) is made up of 13-digit code and add-on code. The former is made up of: 3-digit journal prefix number "491"; 1-digit spare code "0"; 5-digit magazine code; 2-digit volume number; 1-digit publication year; and 1-digit check digit, whereas the latter is made up of 1-digit spare code "0", and 4-digit price. This code structure was introduced in June 2004. Today, most weekly and monthly magazines issued in Japan are marked with this structure. GS1 Japan cooperates with Magazine Number Agency in registration and management of the code.
For books, we use two EAN-13 symbols to encode necessary data. The first one is ISBN, made up of 3-digit ISBN prefix element "978"; 9-digit consist of 3 elements: Registration group element, Registrant element, and Publication element; and 1-digit check digit. The second one is made up of: 3-digitprefix "192" for the 2nd bar code unique for Japan; 4-digit book classification code; 5-digit price; and 1-digit check digit. GS1 Japan works together with Japan ISBN Agency in registration and management of the number.

1.4.2 Coding for fresh food

In Japan, many agricultural cooperatives (approx. 600) get GS1 Company Prefix and allocate GTIN-13 to their products. In addition, the following coding system unique to fresh foods was developed under the government initiative with GS1 Japan's collaboration.

Fig. 1.4.1-1 Code structure for periodical publications (magazines, newspapers, etc)

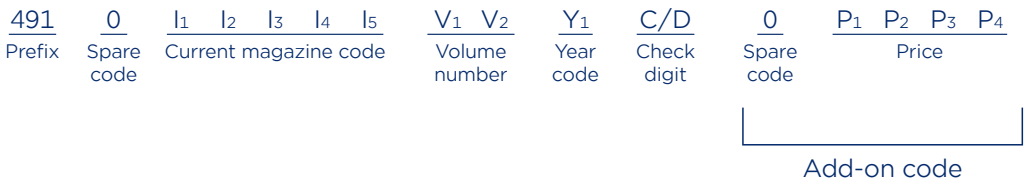


Fig. 1.4.1-2 Code structure for books

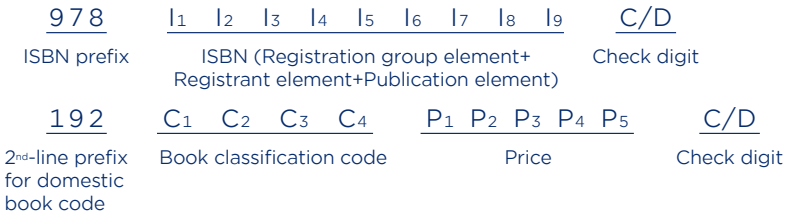
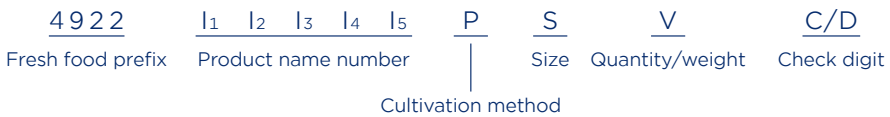


Fig. 1.4.2-1 Fresh food identification code structure



The code structure is intended for application by shippers or in supply chain including use in retail in-store marking and ordering systems.
The code is made up of: a 4-digit fresh food prefix number, "4922" ; 5-digit domestic fresh food standard article code (product name number); 1-digit cultivation method classification for identifying organic farm products or hothouses, etc.; 1-digit size classification for identifying size, e.g., S, M, L; a 1-digit weight/sales unit classification for identifying sales unit, e.g., case, or volume/weight such as 100g or the number of units contained in a package; and a 1-digit check digit.

1.5 Global Location Number (GLN)

GS1 Japan has been promoting the use of Global Location Numbers (GLN) as a location code in B2B transactions. In Japan, there are currently two GLN numbering structures as shown in the table below.
To further promote and encourage the wider use of GLN, GS1 Japan operates GLN database and enable members to register and update their individual location information. We provide GLN and related details in addition to members' information via GEPIR. (See 3.2)
Since April 2013, GS1 Japan has assigned primary GLN with all zeros for location reference, which identifies the member company.
At present GLN is being used to identify companies and business locations mainly in the Ryutsu BMS (See 2), the Japanese EDI standard, and the volume of transaction using GLN is increasing year by year.
In Japan, GLN has been used mainly to identify a company. With involvement of users and solution providers who develop system applications using GS1 identification systems, GS1 Japan will continue its research to encourage the use of GLNs in other context such as business offices, warehouse locations, or business functions.

1.6 GS1 Application Identifier Standards and Use of More Data in Data Carrier

In addition to GTINs and GLNs, other GS1 Identification Keys, for things such as assets and services are standardized. Rules to encode attribute data in GS1 Standard data carriers in conjunction with these identification keys are established as GS1 Application Identifier.
Among the GS1 standard data carriers, there are five kinds of symbols that can carry various data defined in the GS1 Application Identifier Standards, namely, GS1-128, GS1 DataBar Expanded, GS1 Composite, GS1 DataMatrix and GS1 QR code. While EAN/UPC and ITF symbols are only capable of carrying a GTIN, the above-mentioned symbols can hold a variety of attribute information such as product lot numbers and expiry dates. These symbols can also encode GS1 Identification Keys for objects such as location, assets and services. Barcodes that carry Application Identifiers enable the communication of various information between trading partners. This is useful for managing product safety throughout the supply chain, establishing traceability, and controlling assets efficiently.
GS1 Japan believes that solutions using the Application Identifier Standards will become increasingly important. We prepare publicity materials for solution providers to properly implement these standards for their products, and offer explanatory seminars. GS1 Japan also produces flyers for users to introduce what they can do with Application Identifiers and creates opportunities to

Table 1.5-1 GLN numbering structure in Japan

1	2	3	4	5	6	7	8	9	10	11	12	13	NO. Capacity	
M1	M2	M3	M4	M5	M6	M7	L1	L2	L3	L4	L5	C	1,000<	<100,000
M1	M2	M3	M4	M5	M6	M7	M8	M9	L1	L2	L3	C	101<	<1,000

M = GS1 Japan assigned Company Prefix L = Location Reference assigned by Company Prefix holder
C = Check Digit

share use cases. We also support users who want to introduce Application Identifiers to better exchange information. For the use cases and implementation examples will be found in the following sections: healthcare industry 5.1; meat traceability systems, 5.3.1; and process management and traceability for processed food production, 5.3.3,. Payment Slip Barcode for payment agents, 5.4 is an example of standardization of data elements and data carriers to accommodate the local needs using Application Identifiers.
The following are the initiatives of GS1 Japan, focusing on the new data carriers and how to utilize them with attribute information.

1.7 Promoting GS1 DataBar

Since 2006 GS1 DataBar Adoption Plan Announcement, GS1 Japan has been promoting the symbol in the Japanese market. GS1 DataBar attracts attention because of its capability to carry additional data other than product identification. A nation-wide readiness is still yet to come and continued efforts and communication with the retail industry is necessary. GS1 Japan organized the local GS1 DataBar Task Force involving several retailers, manufacturers and wholesalers. The Task Force is supported by a technical advisory team comprising major solution providers. Together with the Task Force, GS1 Japan has developed a local guideline to help users understand the GS1 DataBar and the potential business benefits derived from the use of these symbols. The document was published in March 2011.

1.7.1 Promoting the value of using the GS1 Application Identifier

Retailers in Japan are currently handling additional data at point-of-sale such as price markdowns or sellby dates. But the data format and the data carrier are not standardized. Typically Code-128 without the GS1 Application Identifier made to work with omnidirectional, fixed POS scanners to process additional data. Because these data carriers are used for limited data lengths (usually 22 to 26 digits) and exclusively instore, GS1 Japan is promoting that the importance and benefit of the GS1 DataBar lies in standardized and extensible data strings and in its possibility for expanded data as well as use in open supply chains.
GS1 Japan focuses on educating the retail industry on the value of using a common data set in a standardized way with the GS1 Application Identifier. The guideline published in March 2011 introduces the GS1 Application Identifier from the basics, including examples of use cases or pilot cases for POS in other countries, and encourages the use of the GS1 Application Identifier for additional data, even if some of the data are only for in-store use.

1.7.2 Promoting the guideline and driving broader awareness

GS1 Japan produced a video showcasing the business benefit of using GS1 DataBar as well as GS1 Application Identifiers in 2011. The video is used in barcode basics training courses to promote better understanding about the symbol and the value of using standardized data elements. We also take advantage of every possible occasion including industry exhibitions and seminars by related business associations to promote the use of additional data and GS1 DataBar.

1.8 Promoting GS1 QR Code

1.8.1 QR code introduction

QR code is now widely used in Japan and all over the world. It was invented in 1994 by Denso (now Denso Wave Inc.), one of Toyota Motor Corporation's group companies. It was approved as an ISO international standard symbol (ISO/IEC 18004) in June 2000. The two-dimensional symbol was initially created for

Fig. 1.7.2-1 Panel promoting GS1 DataBar use in Retail Technology Show

Fig. 1.8.1-1 QR code on foods

Fig. 1.8.1-2 Example of QR code

improving production control procedure of automotive parts. After the specification was made publicly available, QR Code became very well-known and widely used. In fact, it is considered to be "the 2D Symbol" especially in Japan.

Today's widespread use of QR Codes is due to the incorporation of a bar reader for QR codes in mobile phones with cameras in the early days of mobile communication. The most popular use of QR code in Japan is to encode URL of a mobile website. Because of pervasive deployment of QR Code decoder in mobile phones, consumers can decode information contained in a QR code, which has literally made the symbol ubiquitous in Japanese daily life. Now it is almost the norm for mobile phones to also have software that generates QR codes for any given data. QR Codes are visible everywhere and anytime, and they are scanned (and sometimes generated) by consumers. (see 5.2 for Mobile Applications).

Carrying mobile URLs isn't the only way to use QR codes in the mobile industry. QR codes also carry a variety of data including ticket information, payments, and coupons. Such uses are rapidly increasing. QR codes are either printed on paper or displayed on a customer's mobile phone screen, and are read with image readers. The use of QR codes will only increase in the future at least steadily, if not phenomenally.

Because of its high recognition as a 2D symbol, QR Code is making its way from B2C to B2B and B2B2C use. QR codes are used for traceability in food and other product supply chains. An increasing number of upstream suppliers of processed food use QR codes by encoding GS1 data defined by Application Identifier standards (see 5.3.3). Government organizations recommending traceability acknowledge the QR code as an optional data carrier for implementing a traceability system. Logistics companies started to use QR Code to encode asset identifier.

1.8.2 GS1 QR Code and Extended Packaging Application

In 2012, GS1 standardized a new application called Extended Packaging for the brand owners to provide information or service about a product to consumers using mobile devices. For this application, the GS1 QR Code is added as an option to encode the standardized data strings. Brand owners can use either GS1 QR Code or GS1 DataMatrix to encode GTIN and the URL to which the consumers access to obtain product information.

On a product package, a GS1 QR code/or GS1 DataMatrix encoding the GTIN and a URL can be displayed in addition to the EAN/UPC symbol for the supply chain use.

Fig. 1.8.2-1 Example of a GS1 QR code

www.dsri.jp/4912345000156

Benefits of GS1 Extended Packaging

1) Advantages of displaying a combination of a GTIN and URL

① Allowing the consumer to quickly and directly access to the detailed information or service web page for the product itself. This saves consumers the time and the number of "clicks" to reach the intended information/ services compared to be led to the top page of product brand or company.

② Allowing the brand owners to run promotion/ marketing campaign easily and effectively.
Having a URL with GTIN as an entry point to campaigns enables brand owners to collect more information about the relationship of each product and participants to the campaign. Information

including what product did this consumer buy and his/her personal information such as age, gender or the region/city of residence can be collected and sorted out with relative ease. This will give brand owners a tremendous advantage for marketing and merchandising.

2) Allowing the brand owners to be effective in marketing research. Since GTIN and standardized data strings are used, linkage with other systems and databases is possible. For example, the company collects applicants' data with GTIN, they can match this data with their sales data from POS.

1.8.3 Promoting the use of GS1 QR Code

GS1 Japan has been promoting "GS1 QR Code" to both user and technical community. We have been promoting GS1 QR Code and Extended Packaging application to users stressing the benefit of using GTIN and URL together. There are potential business cases for a GTIN and URL used together in GS1 QR Code (see 5.2.6).
The GS1 QR code is a subset of ISO/IEC 18004: QR Code 2005. The data is encoded in the GS1 Standard way using FNC1 mode and the GS1 Application Identifier data format. We have been encouraging solution providers to make sure their products have incorporated GS1 QR Code and are capable of GS1 Application Identifiers with easier user interface. Currently application area of GS1 QR Code is limited to Extended Packaging. However there are business cases to use GS1 QR Code for other areas where 2D data carrier is allowed now. There will be more data demanded in value chain and from consumers and almost certainly the field for GS1 2D symbol will expand. Therefore it is more important than ever to educate both users and solution providers on GS1 Standard data elements and data carriers – what can be achieved by them and how they should be used. GS1 Japan will continue its effort to support the community in developing standards and promoting them.

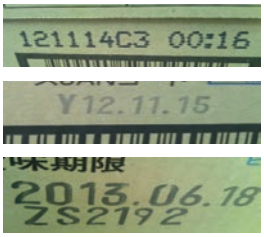
GS1 QR Code application area broadened
In 2014, application area of GS1 QR Code was extended to include the use of other GS1 Identification keys such as GDTI, GSRN, GRAI, GIAI and direct part marking. Except for Regulated Healthcare Trade Item and Assets Identification where GS1 DataMatrix is the only 2D matrix symbology choice, GS1 QR Code is an equal option with GS1 DataMatrix where 2D symbology use is allowed in GS1 system.

1.9 Technical Research : Direct Printing of Barcodes with Variable Information on Cardboard Boxes

1.9.1 Background of the research

In 2012, GS1 Japan initiated a study to look into the current level of ink-jet technology (IJP) to print barcodes with variable information directly onto cardboard (corrugated) boxes.
In the Japanese Consumer Packaged Goods (CPG) and grocery sectors, many distribution centers of wholesale businesses manually enter dates (text information) printed on cardboard boxes for the purpose of location management and shipment control based on the freshness date. Since businesses in these sectors desired very much to automate this process, the introduction of a barcode system is being considered. CPG brand owners are looking into IJP direct printing to reduce expense required for printing compared using labels. We decided to evaluate the present situation of IJP direct printing of barcodes with variable information on cardboard boxes under varied conditions and reviewed the results.

Fig. 1.9.1-1 Date and other information in text on corrugated boxes (examples)



1.9.2 Direct printing and barcode quality

Thanks to the cooperation of printer manufacturers, we used five models of commercially available high-resolution inkjet printers capable of barcode printing. We varied a number of parameters such as the material of the cardboard boxes, transfer speed during printing, codes to be printed and their content (data for the barcode, minimum bar width, etc.) to verify the quality of each barcode.
From the results of this technical verification of printing, we conclude the following.
We judge that inkjet technology to print barcodes with variable information itself is in the level to be able to continue further studies with a view to commercial application. We also confirmed that the biggest challenge for inkjet direct printing on cardboard boxes is some degradation in the symbol contrast depending on the color of the box material and ink absorption in the barcode area. More than 90% of the white liners were evaluated as Grade C and a printing quality of

Grade C or higher can be expected for this white material. On the other hand, the ordinary liner provided poor contrast and more than 90% was evaluated as Grade D. Values other than contrast were, however, generally satisfactory.
Based on the results of the previous year, in 2013 we began investigating two topics. The first involves the positioning of barcodes with attribute information to be marked on product cardboard boxes where an ITF symbol already printed. ITF symbols are now widely used to for retrieving GTIN on each product box. So, when more companies utilize barcodes to exchange attribute information, it is highly likely that ITF symbols will still be needed, and it is very possible that the two different barcodes will need to be shown on one outer case.
The positioning of ITF symbol is already determined to enable high-speed reading by a sorter in a distribution warehouse. When marking an additional barcode containing attribute information on a product box, it is important to place it in a position and distance in relation to the ITF symbol so that trading partners can read whichever barcode to retrieve necessary information (GTIN only or GTIN and attribute) to them. This includes the company that wants additional information such as the date, as well as the company that just reads the ITF symbol, because it only wants the GTIN.
The second topic involves whether an indicator can be shown to serve as a reference for the low print quality of barcodes being distributed in an open supply chain. Under the current GS1 standard, in the case of GS1-128 and GS1 DataBar Expanded, grade C or higher is required for open distribution. In 2012, when using an installed reader to scan barcodes on cardboard boxes moving on a conveyor belt, many Grade D barcodes were read 100%, for some printed samples. Due to improvement in reading device performance and other factors, Grade D barcodes or lower are being read in distribution centers and other sites. If certain quality requirements per parameters were to be clarified to determine that there would be no problem reading barcodes even with a grade D, then it would be possible for companies to print barcodes directly on the boxes. Users would have greater options for marking packages.

1.9.3 Results of the printing and reading test

In the testing, GS1-128, GS1 DataBar Expanded and GS1 QR code , were printed at the upper side or on the left side of ITF symbols individually. The distance between a barcode with attribute information and ITF symbol was established as summarized in the Fig. 1.9.3-1 so that these data can be read by many types of readers considering different types of reading devices such as single laser type, an oscillation type (a type of reading device which reads barcodes by moving laser beams up and down) and a camera type are being operated.
Based on these position and distance settings, with the cooperation of three IJP manufacturers, we produced 72 samples for reading. Each of the sample was graded using a barcode verifier. As a result, we confirmed that samples of different quality were obtained including Grade D (0.5 to 1.1) and Grade F (0.0 to 0.4).

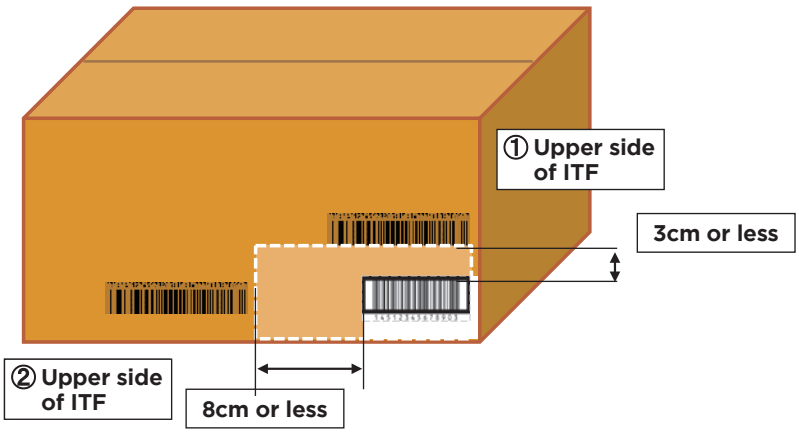
1.9.4 Result of the sample reading

These samples were tested for reading by a reader installed on a conveyor belt which moves 30 to 40 m/minute for 100 times and the number of successfully read times was recorded. A total of five types of reading devices including an oscillation type and a camera type were used for reading the samples.
All of the 48 samples of 1-D barcodes, GS1-128 and GS1 DataBar Expanded, were read 100% by each of the reading device used regardless of the position and distance settings described in Fig. 1.9.3-1, and sample printing quality. Also for two dimensional symbol GS1 QR codes, the samples were read 100% by all the reading devices used for this testing.
These results suggest that when barcodes with attribute information are shown within the distance indicated in the Fig. 1.9.4-1, both ITF symbols and barcodes with attribute information can be read without problems. As far as the necessary quiet zones in the left and right of a barcode (the width varies depending on the symbol) are secured, the barcode can be read even when an ITF symbol and a barcode

Fig. 1.9.3-1 Location and distance of barcode with additional data and ITF symbol

	①Upper side of ITF	②Left hand side of ITF
GS1-128	2cm, 3cm	6cm, 8cm
GS1 DataBar Expanded	2cm, 3cm	6cm, 8cm
GS1 QR Code	2cm, 3cm	8cm, 11cm

Fig. 1.9.4-1 Placement and distance of barcode with additional data to ITF symbol



with attribute information are located adjacently
In addition, for reading low print quality barcodes. among the samples used this time, several samples were of relatively low quality within the range of Grade D, even these samples were read 100% by each of devices used for reading them. Because for pre-printed ITF symbols on cardboard boxes, Grade D barcodes have been allowed, and they have been accepted on distribution sites, it is highly likely that barcodes with attribute information are readable by existing devices without problem when the quality is Grade D or better. However, compared with pre-printed barcodes, barcodes printed by IJP have higher quality deterioration risk in distribution processes. Therefore, it is necessary to aim at as better quality as possible when barcodes are printed.
For IJP printing, materials and how packaging lines must be reviewed thoroughly and also for reading, it is essential to conduct preliminary test.
In the future, we will share such technical information with brand owners, wholesalers and retailers and if barcodes with attribute information are to be shown on cardboard boxes, we will prepare for guidelines for domestic use through the reviews of matters such as conceivable data content, size and positions while keeping actual operating environment in mind.

2. eCom (EDI)

2.1 History and Current Status of EDI in Japan

EDI in the retail sector in Japan started with the Electric Ordering System (EOS) using the JCA Protocol (*1), the standard data communication protocol drawn up in 1980 by the Japan Chain Stores Association (JCA).
In the 1990s and thereafter, EDI also came to be adopted for business processes other than ordering.
In the 2000s, XML-based Ryutsu (*2) Business Message Standards (known as Ryutsu BMS) was established for the purpose of achieving efficient information sharing among companies.

2.1.1 Development of Ryutsu BMS

The JCA Protocol drawn up in 1980 became widespread as an EOS for retail businesses.
In 1990s, the business procedures covered by EDI expanded from the EOS to shipping and receiving of goods, invoicing and payment. From late 1990s to early 2000s, the following issues were identified:

- Low speed
- Inability to deal with Kanji characters and images
- Necessary communication equipment was discontinued
- Difficulty in adding new data fields due to the fixed-length data format
- Message formats differed from retailer to retailer

Concerned about the situation, Japan's two supermarket organizations cooperated and started to develop next-generation EDI in June 2005. With support of METI(Ministry of Economy, Trade and Industry), the Ryutsu BMS were created as a new EDI standard in April 2007. The Ryutsu BMS is now being increasingly adopted throughout the Japanese retail industry.

2.1.2 Outline of the Ryutsu BMS

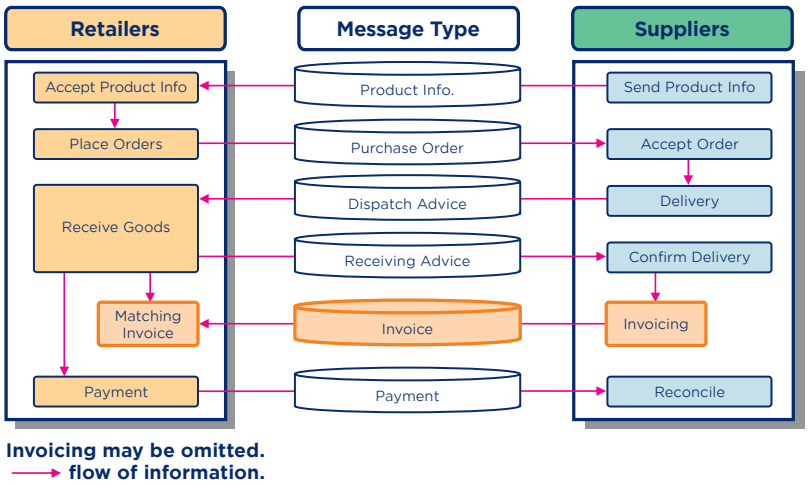
Communication infrastructure

There are three standard communication protocols to exchange Ryutsu BMS messages;

- Server-to-server protocol: ebMS and AS2
- Client-to-server protocol: JX Protocol (*3)

In addition, guidelines for secure internet communication were prepared. And the use of three certificate authorities that meet the guidelines are recommended.

Fig. 2.1.2-1 Typical Turnaround Business Processes and Ryutsu BMS Messages between Retailers and Suppliers



*1 JCA Protocol
The standard communications protocol for electronic ordering established in 1980 by the Japan Chain-stores Association (JCA). The communication circuits available for the protocol are public circuits (2,400 bps) and DDX circuits (9,600 bps), and cannot transmit Kanji and images. DDX circuits are packet communication services using telephone circuits provided by NTT.

*2 Ryutsu
Japanese equivalent of supply and demand chain, typically consists of three groups; Manufacturers, Wholesalers and Retailers.

*3 JX Protocol
The communications protocol for transmitting messages from a client terminal to a corresponding server on a TCP/IP network. Using the international SOAP-RPC standard, the protocol realizes functions equivalent to those of the J Protocol. The JX Protocol has become a standard communications protocol for exchanging EDI messages between client and server in the Ryutsu BMS.

Standard Messages

There are 2 types of messages:

・Basic messages

Intended for use at supermarkets, drugstores, etc. 26 basic messages were published based on the Order to Cash business model. In 2010, retailers and the apparel industry worked together to develop peer-to-peer product information data messages.

・Department store messages

Japanese department stores have unique transaction models that are different from those of other retailer categories. For example, they register a merchandise purchase when the merchandise has been actually sold, and also they need to manage pre-ordered seasonal gifts for the Japanese custom of giving gifts twice a year, in summer and at year-end. Therefore department stores use 27 messages in their transactions.

2.1.3 Efforts to promote Ryutsu BMS

GS1 Japan, with Ryutsu BMS Council (see X.X), take various efforts to encourage wider use of the Ryutsu BMS.

・Trainings and seminars:

GS1 Japan offers wide range of trainings varying from introductory to advanced implementation courses. We also hold seminars introducing best practices by Ryutsu BMS users and solution providers.

・Promotional materials:

Flyers, brochures and videos are made available to anyone interested in Ryutsu BMS. We also have Ryutsu BMS dedicated website, which is kept up-to-date.

2.1.4 Users' commitment to Ryutsu BMS

According to a survey conducted by GS1 Japan, 176 retailers and 224 wholesalers or manufacturers have already adopted or intend to adopt Ryutsu BMS. Detail of the survey is described in Table 2.1.4-1.

2.2 Supply Chain Standards Management & Promotion Council

Supply Chain Standards Management & Promotion was founded in April 2009 by various industry groups to promote Ryutsu BMS (see 2.1.3) in Japan's retail sector. Initially the council consisted of 2 types of members-trade associations of manufacturers, distributors and retailers in the consumer goods industry as full members, and IT businesses and solution providers as supporting members. As of March 2015, there were 49 full member organizations and 187 supporting

Table 2.1.4-1 Number of companies implementing Ryutsu BMs as of March, 2015

Retailers

Business Category	Adopted	Plan to adopt	Subtotal
Supermarket	117	12	129
Department Store	8	3	11
Drugstore	24	0	24
DIY	4	0	4
Cooperative Store	4	0	4
Warehouse Club	1	0	1
Voluntary Supermaket Chain	1	0	1
Discounter	2	0	2
Total	**161**	**15**	**176**

Wholesalers or Manufacturers

Business Category	Adopted	Plan to adopt	Subtotal
Food and Beverage	57	0	57
Confectionery	21	4	25
Commodities and Cosmetics	25	0	25
Drug	6	2	8
Apparel and Shoes	29	8	37
Food	30	2	32
Household Goods	10	1	11
Packaging Material	14	8	22
Toys and Hobbies	3	0	3
Consumer Electronics	2	0	2
Others	2	0	2
Total	**199**	**25**	**224**

members. Upon establishment of GS1 Japan Partners (see 6.1) on April 2015, supporting members withdrew from the council and joined the Partners.

Organizational structure

(1) General Assembly

Once a year the Council holds a general assembly at which it approves the results of activities of the previous year as well as the new agenda for the next year.

(2) Executive Committee

The role of the executive committee includes making important decisions on the council's management, such as admitting new members, establishing and abolishing working groups, and appointing working group members.

(3) Working Groups (Fig. 2.2-1)

1) Message Maintenance Working Group
   This group maintains and manages the Ryutsu BMS messages and various guidelines. The work is done in response to requests from full members for changes or additions to Ryutsu BMS. The group examines such requests, decides on the steps to be taken, revises the relevant guidelines and publishes new standards.
2) Technical Specification Working Group
   This group maintains and manages the guidelines for network technology and information processing technology used for exchanging the standard messages of the Ryutsu BMS via communications circuits.
3) Promotion Working Group
   This group examines and implements steps to encourage wider adoption of the Ryutsu BMS. The group also monitors "off the standard usage" of Ryutsu BMS.

Activities for promotion and increasing adoption

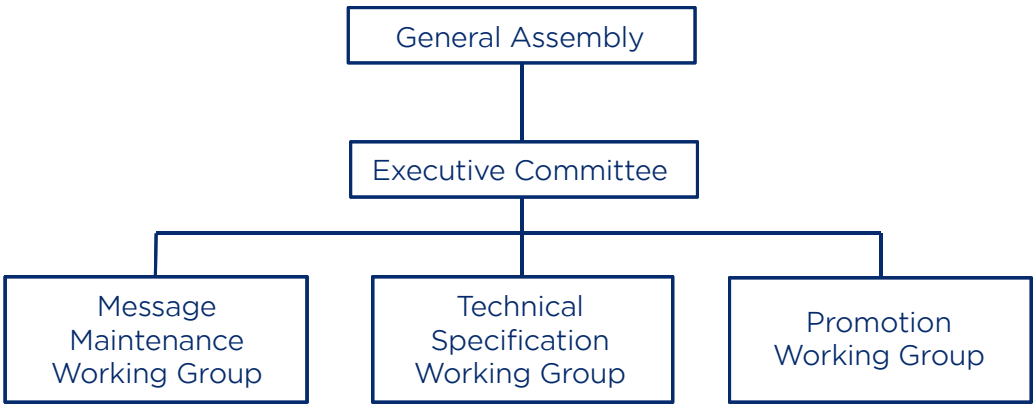
GS1 Japan and the council take various efforts to encourage wider use of the Ryutsu BMS. For details see 2.1.

Registration of the Ryutsu BMS trademark

GS1 Japan has registered the Ryutsu BMS logo to be used for products and services that comply with the Ryutsu BMS specifications. As of April 2015, there are 93 products accredited and permitted to use the logo.

Fig. 2.2-2 Ryutsu BMS logo

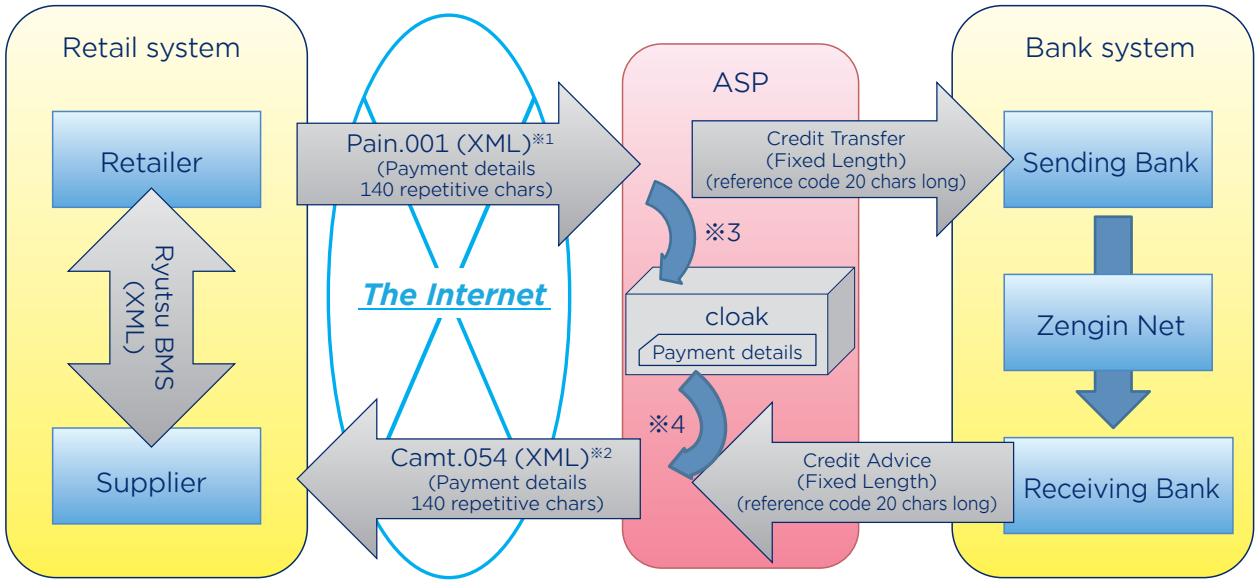
Fig. 2.2-1 Organizational Structure of the Council



2.3 Connecting the retail industry with the banking industry using Ryutsu BMS

GS1 Japan is working on standardization of the EDI infrastructure which goes beyond retail.
Thanks to diffusion of XML based Ryutsu BMS, more and more exchanges of trade transaction information between retailers and suppliers have been automatically processed in Japan. However, between companies and financial institutions, EDI standards that use fixed-length message and public lines are still common. The message format allows only 20 characters for information regarding the payment. Therefore no more than reference code and total payment amount can be entered. Linking payment details for information regarding the payment and trade transaction information was difficult. When there were payments from buyers, suppliers were often unsure about which trade transaction the payment was for and whether there were balanced out items or not. These cases make bank reconciliation and accounting work inefficient.
Under such circumstances, the banking industry has been considering financial EDI utilizing the internet for a long time. The 6th Generation Zengin System* which came into operation in November of 2011, made it possible to send and receive information in XML format (ISO20022). The system significantly increased the amount of payment information available in messages from 20 characters (reference code) to 140 repetitive characters (payment details). As this example shows, the environment enabling mutual data utilization with industries is starting to be established.
Therefore, GS1 Japan began the research in 2012 to link the trade transaction information, which are exchanged using Ryutsu BMS, and the payment details, which are exchanged between companies and banks, in collaboration with the banking industry. In reality, the environment to implement ISO20022 has not been sufficiently established in the banking industry yet, so we try to share information by utilizing the function called "cloak" where the payment detail information is held, as shown in Fig. 2.3-1.
In order to for "cloak" to work, we have to consider followings.
(1) What kind of information required in "cloak"?
(2) Is this model (Fig. 2.3-1) feasible?
We expect that this initiative will streamline the accounting work in the retail businesses and enhance its accuracy by promoting the link between the retail industry and financial industry, making negation of accounts receivable easier, etc.

Fig. 2.3-1 Using "cloak" to communicate trade information between retailers and suppliers using ISO20022 messages



※1 ISO20022 pain.001 (Credit Transfer)
※2 ISO20022 camt.054 (Credit / Debit Notification)
※3 Cloak stores details of the payment (140 chars repetitive) and pass 20 char long reference code to bank system.
※4 Upon receiving reference code, cloak pass details of the payment (140 chars repetitive) to retail system.

* Zengin System: Inter-bank network system that allow individuals or companies to request transfers with financial institutions.

3. Database Service

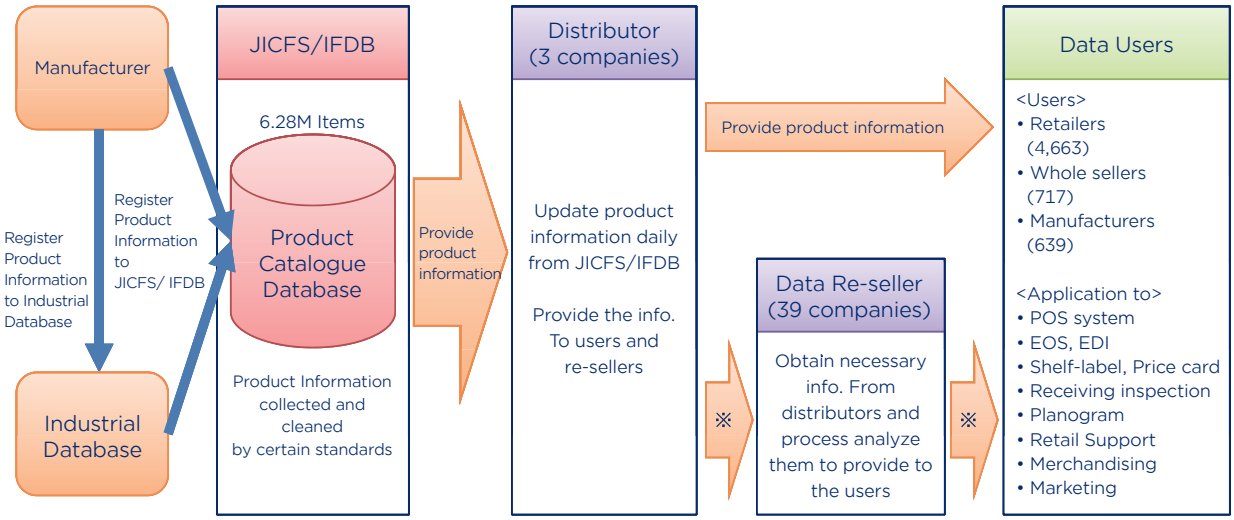
3.1 JICFS/IFDB (JAN Item Code File Service/Integrated Flexible DataBase)

Since 1988, GS1Japan has been operating the JICFS/IFDB database of product catalogues and has been collecting and maintaining basic product data, e.g., GTIN, product names, product categories, weights, and amounts. This database is used for two purposes: POS product masters at retailers and EOS masters between wholesalers and retailers. The JICFS/IFDB database is recently being used for a variety of other purposes, including online shopping portals and for marketing research. Companies operating online shopping portals use GTIN for product information control since stores in their portals manage product information using their own codes and product names. These portal firms also use JICFS/IFDB to unify the management of their product information because the same products have often been registered under different names and categories.

The use of the JICFS/IFDB has been promoted not only in the distribution industry, where the database is already in wide use, but also in the area of social welfare. For instance, this database has been used for voice guidance experiments in which vision-impaired consumers themselves can scan a product's barcode and have their personal computer or other device speak the name of the product.

Product data is collected and arranged according to JICFS/IFDB standards and is then offered at cost to retailers, wholesalers and other users via distributors

Fig. 3.1-1 JICFS/IFDB system flow



※Provide product information via Data re-seller

	2011	2012	2013	2014	2015
Food	1,043,430	1,123,796	1,209,636	1,291,008	1,371,489
Commodity	590,008	628,054	673,700	714,237	759,793
Recreation and Miscellaneous	334,197	382,640	417,922	453,135	492,503
Durable Goods	195,070	211,385	230,718	262,309	281,236
Apparel, Personal items & Sporting goods	183,405	204,713	222,660	245,395	270,240
Other	3,494	4,585	3,315	3,262	3,230
Active item Total	2,349,604	2,555,173	2,757,951	2,969,346	2,969,346
Inactive Data	3,104,154	3,104,154	3,104,154	3,104,154	3,104,154
Grand Total	**5,453,758**	**5,659,327**	**5,862,105**	**6,073,500**	**6,282,645**
Increase in number of items (year-on-year)	245,838	205,569	202,778	211,395	209,145
Rate of increase (year-on-year)	104.72%	103.77%	103.58%	103.61%	103.44%

(Fig. 3.1-1). As of March 2015, product information data registered in the JICFS/IFDB covered over 6 million products from 30,000 manufacturers. About 6,000 companies, of which 80% are retailers and 12% are wholesalers, currently use the database. By using product information managed by the JICFS/IFDB, user companies can perform the communications, inquiries and registration tasks related to product data promptly, precisely and at a low cost. As such, the product information is being widely utilized by small and medium businesses.
The product information in JICFS/IFDB includes JICFS classification codes that indicate product categories. These codes are used as search keys for extracting the necessary product groups, and as aggregate keys for aggregating similar products for data totaling, processing, and analysis.
The JICFS categories are revised as necessary. In March 2014, minor changes were made for OTC (Over the Counter) drugs. Revision of the JICFS categories for confectionary is also being discussed now, together with confectionary industry associations.

3.2 GEPIR

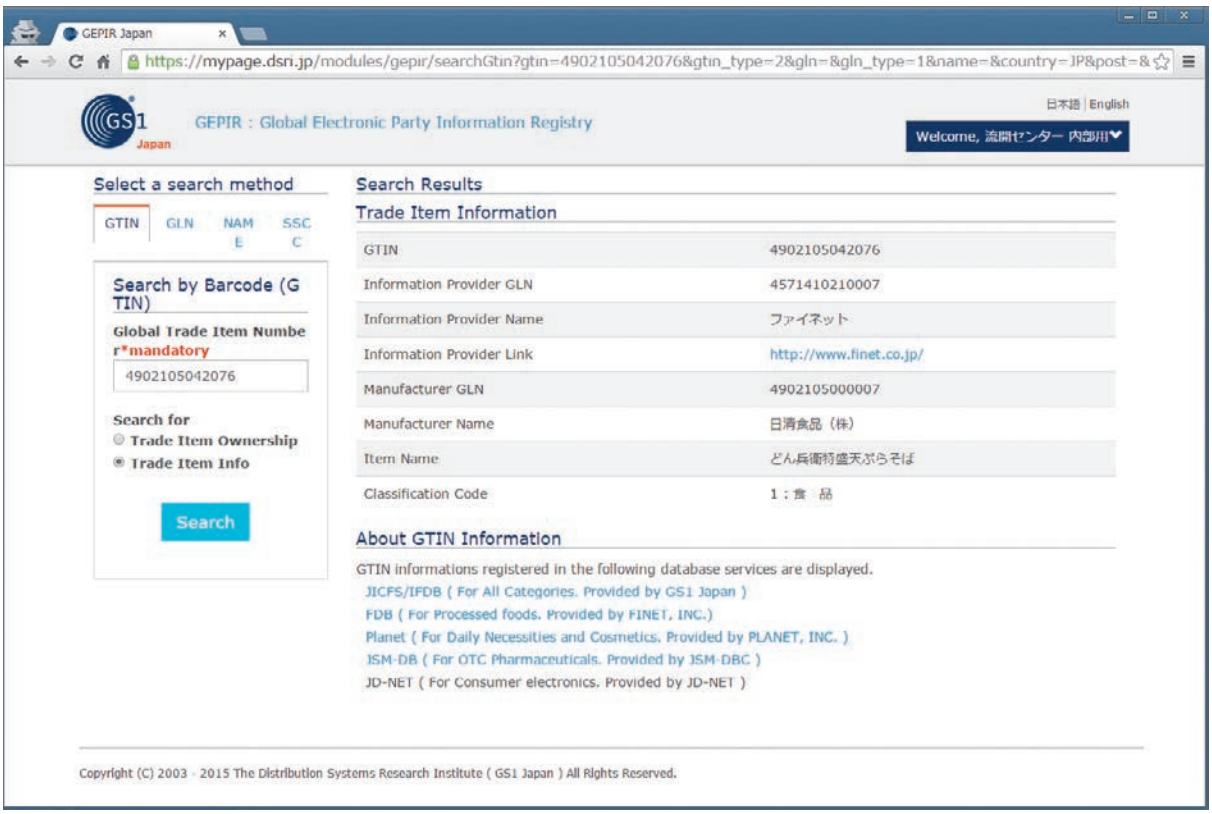
GEPIR, the company database of those who have registered and acquired GS1 Company Prefix, in Japanese language has been accessible since 2003 at GS1 Japan website.
Starting from 2007, the detailed location data for each GLN have been added to it and accessible as well.
In January 2014, a service was added that allows users to access basic product information through GEPIR. This information is registered in JICFS/IFDB (see 3.1), the product catalogue maintained by GS1 Japan. The main product types in the database include alcoholic beverages, processed foods, commodities, cosmetics, OTC drugs, and home appliances. The following information is available on GEPIR.

- GTIN
- Information Provider GLN
- Information Provider Name
- Information Provider Link
- Manufacturer GLN
- Manufacturer Name
- Item Name
- Classification Code

The search results are as shown in Fig. 3.2-1.

In FY2014, we began the development work for the system replacement. We have shifted to the new service in July 2015.

Fig3.2-1 Product Information search result



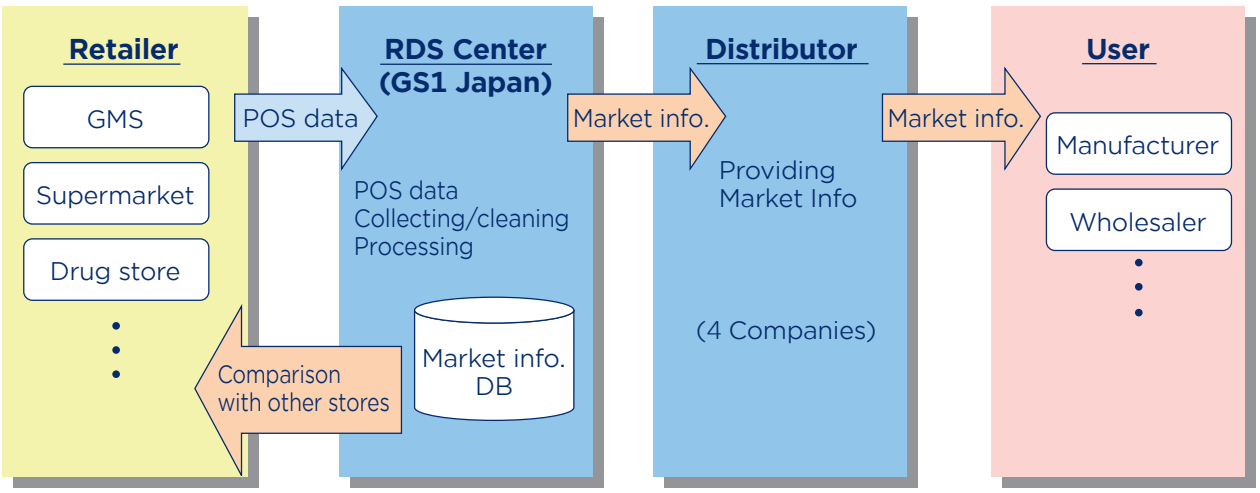
3.3 RDS (Ryutsu POS Database Service)

RDS is a POS(Point of sale) database service run by GS1 Japan, collecting POS data from retailers and give them feedback and to distribute analyzed data to wholesalers and manufactures. It is now an infrastructure for market research or retail support available at low cost.
The users are retail and wholesale industries as well as local and small-scale manufacturers (see Fig. 3.3-1 for RDS System for data collection and distribution scheme).
Retailers that participate in RDS and regularly provide POS data can use the Web-based POS Data Analysis Service without charge.
Retailers only need a PC connected the Internet to use the service, and even small-scale retailers can easily compare and analyze their own POS data with data from other retailers in the region. See 3.3-1 for detailed case examples. The word RDS stands for Ryutsu POS Database Service, and the Japanese language term "Ryutsu" collectively refers here to manufacturers, wholesalers and retailers. In the first pilot of the development and operation of the RDS we conducted in 1985, when POS systems were just coming into use in Japan, aiming at establishing market research services through the use of POS data.

3.3.1 Enhanced function and extended use of RDS

For its member retailers, RDS used to provide data in a file format that compared members' product prices and sales volumes with those of other stores. In 2005, RDS was upgraded to the Web-based POS Data Analysis Service, which offers the results of POS data analysis via the Internet. The primary feature of the service is that anyone can easily compare and analyze one's own POS data (sales status) with data from other stores (store names undisclosed). This function allows users to readily find missing items in product lines or pricing errors, which their individual POS data would not reveal (see Fig. 3.3-1).
The information can be also utilized as effective tools by wholesalers to provide retailers with well-developed support, such as proposals for selection of product lines targeted to market trends, and by product manufacturers for product development as well as planning and reviewing sales strategies. Additionally, RDS data has recently been used by some Japanese universities as basic data for economic analysis.
Web-based POS Data Analysis Service case example-
Owners and store managers of small-scale retailers can easily utilize POS data Since the Web-based POS Data Analysis Service enables user retailers to easily compare their own POS data with data from other stores, users have increased including small-scale retailers that may have a difficulty in utilizing POS data. The system generates several kinds of analysis reports including the Store Evaluation Report (in what product category the retailer is less competitive in the region), The Opportunity Loss Elimination Report (what is selling well in the region but not sold as much at the retailer). The Opportunity Loss Elimination Report is the most popular and is effective for collecting information on hot-selling products and preventing opportunity losses. The following is the case example of a small-scale regional grocery supermarket, where a retailer, from top management down to employees utilize POS data by sharing reports from the Web-based POS Data Analysis to improve internal communication and decisions making process on selecting products.

Fig. 3.3-1 RDS system



3.3.2 Retailer's case study: Sales of snack foods increased through the use of web-based POS data analysis service

A local supermarket "A" in the Tohoku district increased its sales of snack foods by using the webbased POS data analysis service.
In the past, Store "A" had displayed snack foods in two areas in the store (standard and end). In the standard area, snack foods packaged in bags and boxes were displayed on two different shelves, while the end area was used mainly to display snack foods in bags. Boxed snack foods were not often sold in the end display.
The web-based POS data analysis service identified two problems on a sales strategy of selling snack foods packaged in boxes. First, in the sales ranking of boxed snack foods, seven products in the top ten had smaller PI amounts than those of the district. Second, the average unit price of all boxed snack foods in Store "A" was fairly higher than the RDS average.
Because of this, the store management started working on a boxed snack food sales strategy, aiming for gains in snack food sales.

Analyzing customer management data in Store"A"
Store "A" had already introduced a loyalty card system. Prior to the performance comparison using the web-based POS data analysis service, the store management analyzed their own customer data which revealed that, among snack food buyers, the most loyal customers tended to buy snack foods both in bags and in boxes at the same time although they were displayed on different shelves.
Based on this finding, they reviewed their conventional

Fig. 3.3.2-1 Report example of web-based POS data analysis service

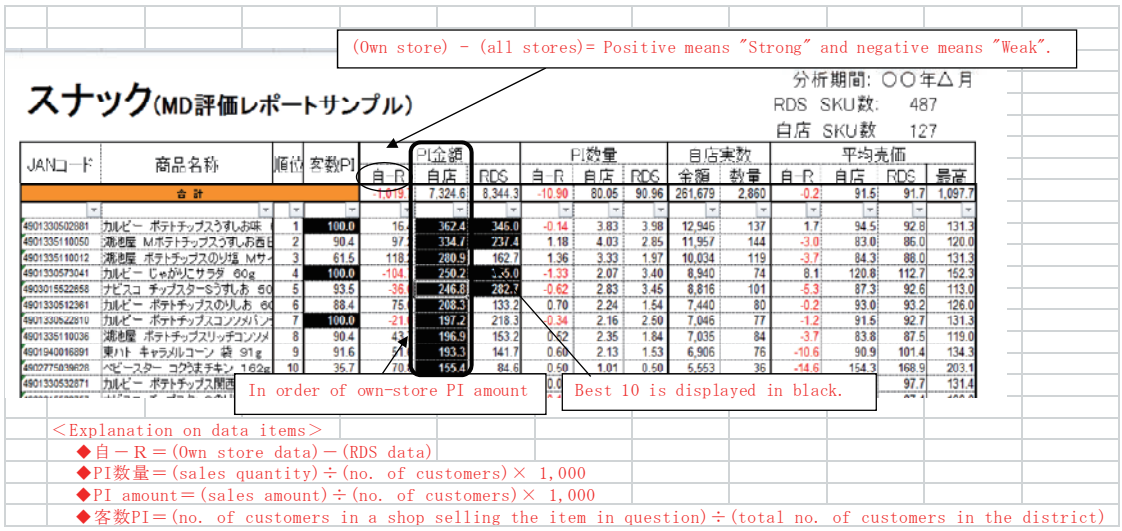


Fig. 3.3.2-2 Snack-food section of Store "A" after improvement

approach of displaying only bagged snacks in the end display. The review resulted in a new sales plan. Store management decided to display snack foods both in bags and in boxes together in the end area so that customers could pick up both package types snacks in one area.

Using the web-based POS data analysis service

As a next step, they checked the web-based POS data and found that their average unit price of boxed snack foods was approximately 20% higher than the RDS average unit price in the district. Especially for the most important products with a 100% penetration rate in the district, Store "A" had the highest prices. Promptly, they took action to reduce the prices of those products to the RDS average unit price of the district.
In addition, they checked the RDS web database for new products which had not yet been sold in Store "A." Among them were some highly marketable and important products with high penetration rates in the district (approximately more than 70%) and high PI amounts* (more than 200 yen). They decided to sell such products.

Verifying the improvement effect

One month after this improvement in the store's snack food sales strategy, the PI amount of the main boxed snack foods rose from 492 yen to 1,840 yen, a significant increase of approximately four times.
Also, the PI amount of snack foods overall increased from 10,980 yen to 16,345 yen, an increase of almost 1.5 times. These results confirmed the improvements achieved through the use of the web-based POS data analysis service.
GS1 Japan regularly holds information exchange meetings for retailers who are users of the web-based POS data analysis service.
Learning the success of Store "A", another retailer started a similar approach and also increased its sales of snack foods.

*1. PI is short for purchase index and shows the number of products (product group) or sales amount purchased per 1,000 shoppers. It shows the strength of customer support for product (product group) in numerical values.
*PI amount = amount of sales per 1,000 customers who purchased in the store.

4. EPC/RFID

4.1 EPC/RFID in Japan

The movement to utilize RFID as a next-generation data carrier in supply chains led to the establishment of the Auto-ID Center at the Massachusetts Institute of Technology in 1999. Over 100 wholesalers, retailers, manufacturers and system vendors from around the world collaborated to advance researches on RFID. Those efforts then led to the founding in 2003 of EPCglobal for the purpose of standardizing and promoting EPC/RFID systems. In this context, in 2004, EPCglobal membership was established in GS1 Japan, and in 2015, the membership was taken over to the new GS1 Japan Partners Program (see6.1).
Since a set of GS1 EPCglobal standard specifications were already laid down, our focus is on promoting the implementation and use of these EPC/RFID standards. Accordingly, our EPC/RFID-related services have shifted to the current and potential users of EPC/RFID standards and Solution Providers who are helping users implement systems based on the standards. The following services are provided in the new partners program:

- Provide information on the trend of standardization and overseas best practices
- Provide information about EPC/RFID-related standards (i.e. EPCIS)
- Site visit for EPC/RFID best practices
- Provide tools and support that help users/solution providers implement EPC/RFID-related standards
- Facilitate interchange between partners and aid solution providers' standard promotion activities.

4.1.1 Recent Activities of EPC/RFID

GS1 Japan's EPC/RFID promotion initiatives include the following activities.

- Holding regular EPC/RFID introductory courses, including a EPC/RFID demo for users
- Building of EPCIS common infrastructure and demonstrating the system
- Partnership with related organizations (ISO SC31 national committee, Japan Automatic Identification Systems Association (JAISA), etc.)
- Holding EPC/RFID related seminars including the EPC RFID FORUM.
- Establishing RFID study committees interested in developing RFID system.

4.2 EPC/RFID Initiatives in Japan

4.2.1 Transport and logistics supply chain visibility: APEC Supply Chain Visibility Feasibility Study Workshop in Kazan Russia

METI (Ministry of Economy, Trade and Industry) announced the Recommendation on Implementation of the Cargo Status Information Network for Enhancing Supply Chain Visibility at the Supply Chain Visibility (SCV) Feasibility Study Workshop in Kazan, Russia. This workshop was held in May 2012. Representatives from various industries, governments, and international standards organizations participated. GS1 Japan provided support by inviting representatives from GS1 GO and the MOs of the APEC region. The workshop was held in three sessions. In the first session, country representatives shared best practices for enhancing supply chain visibility in the APEC region. Best practices were demonstrated to the audience through concrete activities and benefits of supply chain visibility based on EPCIS technology. In the second session, METI outlined the necessary information to be shared by each stakeholder in the supply chain and introduced its APEC Recommendation. After that, GS1 Japan explained EPCIS, detailing technical points about how EPCIS is structured and suggesting how to develop an ideal information network to enhance supply chain visibility. In the third and final session, the UN/CEFACT and WCO reported on the development progress of international standards and efforts to seek harmonization and interoperability with other international standards.
Through this workshop, the results of relevant projects including best practices were understood and recognized. The benefits of supply chain visibility were acknowledged and the scope of the APEC Recommendation was confirmed. EPCIS was recognized as the key technology that can solve various

issues in supply chain visibility. After the workshop, the APEC Recommendation on supply chain visibility was reported to the Committee on Trade and Investment and formally recognized as an achievement of the APEC Supply Chain Visibility Feasibility Study Workshop. The Recommendation was endorsed by the APEC Trade Ministers' Meeting that took place in July 2012.

4.2.2 Japan's initiatives for EPCIS promotion

GS1 Japan has developed a common platform, a "test bed" for EPC/RFID users called "Showcase". The Showcase is based on EPCIS and provides opportunities for EPC/RFID users to try and learn how EPCIS works. In 2011 and 2012, GS1 Japan conducted a pilot improving supply chain visibility of agricultural produce using the Showcase.
Although GS1 Japan has been promoting EPCIS, it is taking much time to expand the use of EPCIS in the Japanese market. One of the reasons is that EPC/RFID users find it very difficult to understand the concept of EPCIS. They also find it difficult and costly to develop a prototype system to try out the EPCIS functions. Also in many cases, technical associates may be at a loss as to where to start a project because of the huge scope of the visibility system. We believe the showcase helps the users who are interested in but hesitant to actually use EPCIS.
GS1 Japan, with support from Auto-ID Lab Japan, IBM Japan and Daiwa Computer, has developed an application system on this showcase to demonstrate the effectiveness of EPCIS. This application system is an agricultural traceability system with which a consumer can check the quality of an agricultural produce. Having been allocated unique ID (SGTIN) and registered other information such as sweetness and the best date to eat at a farmer's site, melons were distributed from the farmer to retailers with EPC/RFID tags.
In FY 2013, GS1 Japan developed a new series of EPCIS seminars incorporated with Auto-ID Lab Japan for system venders and users to improve the awareness of EPCIS. It gave participants an understanding of the EPCIS specifications, and the ways how to design an EPCIS system. According to feedback from participants, many of them were happy with the seminar program, and understood EPCIS better after the seminar. Furthermore, we have also summarized the basic items, such as what purpose EPCIS has and based on what concept it was established, etc., as a guidebook.
GS1 Japan continued to host EPCIS seminars in FY2014 and also prepared e-learning. We have included technically detailed contents, which cannot be covered by the above guidebook, in this e-learning with the aim of being useful for users to actually build EPCIS systems. As a result of these promotions, apparel companies have introduced EPCIS.

4.3 Industry Business Use Case

4.3.1 Apparel industry

TAKA DANCE FASHION Co., LTD is an apparel company that mainly manufactures and sells social dance costumes. They sell their products not only via 5 stores they own, but also via temporary booths at dance events held in various locations in Japan.
They wanted to improve the inventory checking process; especially efficiency and accuracy. When counting inventory, it was cumbersome to scan barcodes of the products. Sometimes the same barcodes were scanned twice. In other cases some products were skipped and barcodes were never scanned.
It used to take them about 12 hours to take the inventory of approximately 9,000 products at the head office. They needed to scan barcodes on some products by removing them from their boxes. At stores, counting inventory of about 3,000 products that were already on display took them approximately 3 hours. At the temporary booths at dance events, they need approximately 2 hours for shipping, receiving and inspection of the products they brought to the venue and the ones they brought back at the office after the

Fig. 4.3.1-1 EPC/RFID operations at a store's backyard

events. They often faced discrepancies between the book inventory and physical inventory.
To solve these problems, TAKA DANCE FASHION Co., LTD decided to attach EPC/RFID tags, in which SGTIN was encoded, to their products in order to make the product count more efficient. As a result, the inventory-taking was reduced from 12 hours to 30 minutes at the head office and from 3 hours to 15 minutes in stores. It enabled them to count in stores almost every day after closing, instead of only once at the end of each month. As for the management of stock counting at event venues and back in the office, the time was reduced from 2 hours to 15 minutes.
After replacing the barcodes with EPC/RFID tags, the inspection work was made significantly more efficient. They now have almost no difference between the book inventory and the physical inventory.
TAKA DANCE FASHION Co., LTD intends to expand the EPC/RFID-tag based product management to non-apparel products, such as dance CDs/DVDs and accessories, etc. They hope to further enhance their customer services by utilizing the time saved by streamlining their work. Eventually they would like to make the supply chain of products manufactured overseas visible with EPC and EPCIS.

4.3.2 Gas industry: Activities of the Japan Industrial and Medical Gases Association

Some 15 million gas cylinders are estimated to be in distribution in Japan. A variety of gases such as oxygen, hydrogen and CO2 are widely used in industry and there are also a huge number of high-pressure gas cylinders in use. There had been no standardized method of managing gas cylinders. Some companies managed them using internal barcode systems while other companies used numbers engraved on the cylinders. It had been difficult to determine the actual owner of a neglected cylinder because two thirds of the gas distributors had not adopted a barcode system. They just visually read the number engraved on a cylinder and copied it on a paper form. Neglected or missing high-pressure cylinders pose a very serious problem because of the risk of explosion due to corrosion.
The member companies of the Japan Industrial and Medical Gases Association (JIMGA) had tried to solve the problem using a barcode system, but it was not successful since there was no standardized barcode management method and no interoperability among the gas suppliers. In addition, barcode labels were not durable enough for business operations in such a harsh environment. JIMGA thus decided to use EPC/RFID for

Fig. 4.3.2-1 EPC/RFID operations at a gas cylinder filling station

managing gas cylinders and developed several types of EPC/RFID tags to attach to various types of cylinders. Each tag encoded with a Global Returnable Asset Identifier (GRAI) is read or written at gas cylinder filling stations by means of handheld scanners, and trucks carrying RFID-tagged cylinders pass through antenna gates for bulk reading of their cylinder shipments. By using the standardized RFID system, JIMGA expects not only to solve problems such as the handling of neglected or missing cylinders but also to achieve more efficient distribution of gas cylinders by managing them as assets. As of December 2014, this system has been implemented by 13 companies at 114 distribution centers and EPC/RFID tags have been attached to about 507,000 gas cylinders. JIMGA is planning to expand the implementation.

4.3.3 Food industry : Cage trolley management

The Cage Trolley Management System was developed by Kibun Trading Inc., a member company of the Kibun Group, and utilizes EPC/RFID technology to manage cage trolleys as company assets. In October 2008, the Kibun Group implemented this system at major distribution centers for refrigerated foods. An EPC tag, which includes a GRAI, is attached to each trolley. The serial number part of the GRAI, which indicates the year and month of purchase (YYYYMM) followed by the trolley number (-NNN), is prominently displayed on each trolley.
To track the location of the trolley, the EPC tag is scanned during shipping and receiving. During shipping, the barcode of the delivery point is scanned with a handheld reader. This reader is also used to scan the EPC tag. This creates an association between the delivery point and the trolley used. When the trolleys are returned, they simply pass through a gate equipped with an EPC/RFID reader which electronically reads and stores the returned trolley information. By tracking the location of each trolley, it is possible to reduce the risk of loss. This enables the company to better manage the number of trolleys needed. Knowing the frequency of use also helps the company to manage the maintenance and life cycle of the trolleys. Through the implementation of the Cage Trolley Management System, the Kibun Group has improved the efficiency of its shipping operations and asset management.
Based on the success of this system, the Kibun Group has decided to implement EPC/RFID in all of their distribution centers throughout Japan.

4.3.4 Pallet rental industry

Japan Pallet Rental Corporation (JPR) rents pallets mainly within Japan as well as to South Korea, China, and ASEAN countries.
JPR mainly provides type 11 (1,100mm x 1,100 mm) pallets, which are the standard pallets in Japan. They possess approximately 3 million wooden type 11 pallets and approximately 6.3 million plastic pallets. (As of the end of March, 2015)

Fig. 4.3.3-1 EPC/RFID operations at a distribution center for refrigerated food

Cage trolley

Cage trolley name board

Fitting attachment for EPC tags

Reading EPC tags

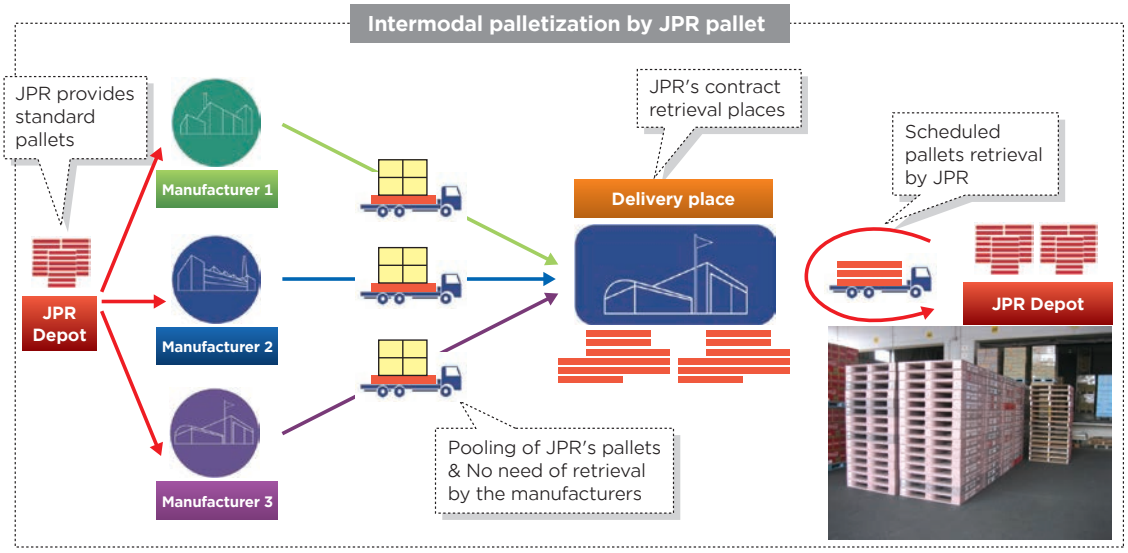
Fig. 4.3.4.-1 Type 11 (1,100mm x 1,100 mm) pallets

Main customers of JPR are food/toiletry manufacturers, wholesalers, and retail store distribution centers, and their share is great in this category in Japan. JPR promotes "intermodal pallet pool" and "joint pallet retrieval" of pallets and promotes a business model in which the pallets are delivered to retail centers by manufacturers, are retrieved by JPR. While the pallet retrieval rate is approximately 99%, they began attaching EPC/RFID tags, which contain the Global Returnable Asset Identifier (GRAI), to plastic pallets in 2006 in order to locate the remaining 1%.
As of February 2015, more than 80% of their plastic pallets are tagged with EPC. Thanks to the utilization of EPC/RFID, they're now able to comprehend the information of their pallets on delivery/receiving at their depots, damage of pallets upon retrieval, and the lifecycle of pallets from production to disposal. In addition, due to the fact that JPR widely utilizes EPC/RFID tags, they had special RFID equipment developed exclusively for them.
Furthermore, JPR offers support to their business partners with distribution equipment management systems using EPC/RFID. One of the users of the system is AEON GLOBAL SCM, a subsidiary of AEON, the biggest retail group in Japan.

AEON GLOBAL SCM has attached EPC/RFID tags, which contain GRAI, to approximately 600,000 roll cages used for store delivery within Japan. They utilize JPR's "Llink (*)" to manage the transfer information of roll cages. By utilizing EPC/RFID tags, they are able to comprehend all of the delivery/receiving information at distribution centers, stores and centers of their business partner. They can now instantly specify location and quantity of the roll cages. With EPC/RFID, AEON GLOBAL SCM can manage roll cages adequately and they can reduce the number of new roll cages purchase.

Fig. 4.3.4.-3 A EPC/RFID tagged roll cages of AEON GLOBAL SCM

Fig. 4.3.4.-2 Intermodal palletization by JPR pallet

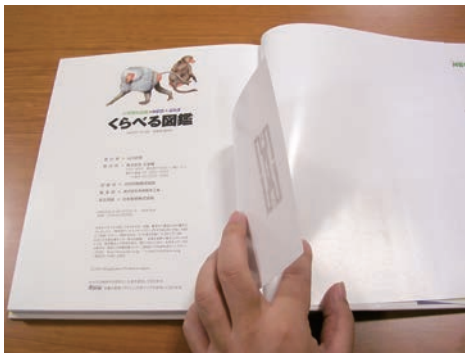


(*) Llink: RTI (Returnable Transport Item) management system offered by JPR to comprehend the inventory and transfer of RTIs utilizing EPC/RFID tags.

4.3.5 Book publishing industry: Item Level Tagging Use Cases

In Japan's publishing industry, the high return rate of books, which is estimated to be about 43%, has been a longstanding issue. In the nation's traditional book trade, consignment ordering, which allows bookstores to return unsold items anytime, is commonplace. This leads to retailers placing more orders than they can actually sell and then having too many returns. Shogakukan, one of Japan's major publishers, has been tackling this issue through RFID implementation since 2008. As of May 2013, Shogakukan has attached UHF Gen2 tag labels to 23 titles with total 2.7million copies. Each copy is uniquely identified with RFID, so Shogakukan can try setting two different trade conditions to each title to compare return rates. One trade condition is conventional consignment ordering and the other is optional non-consignment ordering, which offered bookstores a higher profit margin on each copy sold, but set some restrictions on returning unsold books. The publisher thought this would motivate retailers to sell more books and lead to a more realistic number of orders placed. The booksellers themselves also found another benefit from optional non-consignment ordering. Every bookseller was able to receive the exact number of books that they ordered with the non-consignment option. In pre-tag days, the total number ordered sometimes exceeded the number of copies in the first printing. In such a case, publishers are unwilling to print extra quantities when there is a high risk of returns.As a result, the return rates for most of the tagged titles were reduced significantly.

Fig. 4.3.5-1 Tagged books and process of checking books returned from bookstores



5. Industry Engagement

5.1 Healthcare

5.1.1 Pharmaceutical products

5.1.1.1 Prescription only medicine (Rx)

Prevention of medical errors and accidents is one of the most important challenges in the healthcare industry, and the standardized coding and barcode labeling on pharmaceutical products have been recognized as critical measures. Under these circumstances, the Ministry of Health, Labour and Welfare (MHLW) announced "Implementation Guideline for Bar-coding of Prescription Drugs" in September 2006.
This guideline adopts GS1-128 for the tertiary package and GS1 DataBar for the primary and the secondary packages (GS1 DataBar Limited, GS1 DataBar Limited Composite Symbology, GS1 DataBar Stacked and GS1 DataBar Stacked Composite Symbology) as shown in Fig. 5.1.1.1-1. The guideline required the labeling of GTIN for every level of packages except the primary package of oral and external medicines. For biological products, expiration date and lot number were also required in addition to GTIN.
The Guideline was revised in June 2012. From July 2015, All packages of the primary and the secondary levels including oral and external medicines are required to be barcoded with a GS1 DataBar.

5.1.1.2 Over the counter drugs (OTC)

MHLW has not yet commenced a standardization initiative for over-the-counter (OTC) drugs, though most of them already bear EAN-13 symbology on their packages.

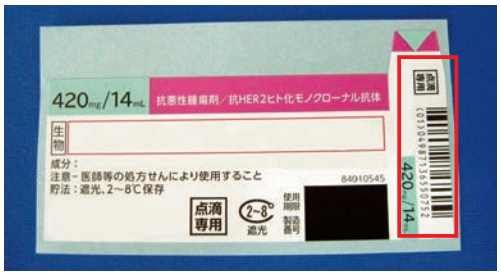
5.1.2 Medical devices

5.1.2.1 The guideline issued by MHLW

The Japan Federation of Medical Devices Associations (JFMDA) resolved to use the EAN/UPC and GS1-128 symbol in 1998, which was followed by the publication of the guideline in 1999 with the help of GS1 Japan. However, the use of these standards had been optional for each company. In March 2003, MHLW published its "Vision for the Medical Device Industry." The accompanying "Action Plan" strongly encouraged the industry to promote the use of information technology systems to build a new product database and use bar codes to increase patient safety. In 2004, for the purpose of inducing the implementation of the agreed-upon standards, MHLW started monitoring their use through JFMDA. MHLW has also been monitoring the coverage of item registration in the database.

Fig. 5.1.1.1-1 GS1 Barcode on pharmaceutical product packages

GS1-128



GS1 DataBar Limited

GS1 DataBar Limited Composite

In September 2007, MHLW announced the draft guideline for barcode marking on medical devices, which was prepared by joint effort with JFMDA. After going through public comment procedure twice during which the draft was modified accordingly, MHLW issued the barcode making guideline in March 2008.

5.1.2.2 Implementation of the guideline

According to the survey conducted by MHLW in 2013, 75.5% of medical devices marketing in Japan are registered in MEDIS-DC database and 96.1% are shipped with GS1-128 symbol labels as shown below.

5.1.2.3 Direct Parts Marking for surgical instruments

Japan Association of Medical Equipment Industries (JAMEI; Current organization name is "Japan Association of Medical Device Industries (JAMDI)") published the first guideline for laser marking 2D symbols,in which GS1 DataMatrix and QR Code were recommended, on surgical instruments for the purpose of patient safety, traceability and effective stock control at the hospitals in November 2006. In 2014, JAMEI revised the guideline to recommend only GS1 DataMatrix on the basis of international compatibility. In July 2010 the GS1 Healthcare Japan (See 5.1.4) also established the "Subcommittee for the Marking of Surgical Instruments," and surgeons at medical institutions, surgical instrument manufacturers, laser marking agents and other interested parties are studying the method for marking the GTIN and serial numbers on surgical instruments.

5.1.3 NTT Medical Center Tokyo Case Study — Traceability initiative of hospital asset management using GS1 Standards—

With approximately 700 patient beds, the NTT Medical Center Tokyo is one of Tokyo's largest general hospitals. In 2011, the hospital was accredited by the Joint Commission International.

Building a traceability system

In 2007, the NTT Medical Center Tokyo started to utilize barcode to record the number of times, used and sterilized, for individual surgical instruments in urology

Table 5.1.2.2-1 MHLW Guideline for barcoding medical devices

	GTIN (01)	Expiry or Use by Date (17)		Lot # or s/n (10/21)	
	All levels	Individual Packcage	Inner Package (*1) and Outer Package (*2)	Individual Package	Inner Package (*1) and Outer Package (*2)
Specially controlled MD, etc (*3)(incl. specially designated maint. Mgmt.. required MD)	◎	◎	◎	◎	◎
Designated insured med. material	◎	◎	◎	◎	◎
MD other than the above	◎	○	◎	○	◎
In vitro diagnostics	◎	◎	◎	◎	◎
Consumable Supplies other than Medical Devices (*4)	◎	–	○	–	○

◎ = Required
○ = Optional

Table 5.1.2.2-2 Barcoding efforts on medical devices in Japan
(Results of the MHLW survey: Answers from 582 Companies)

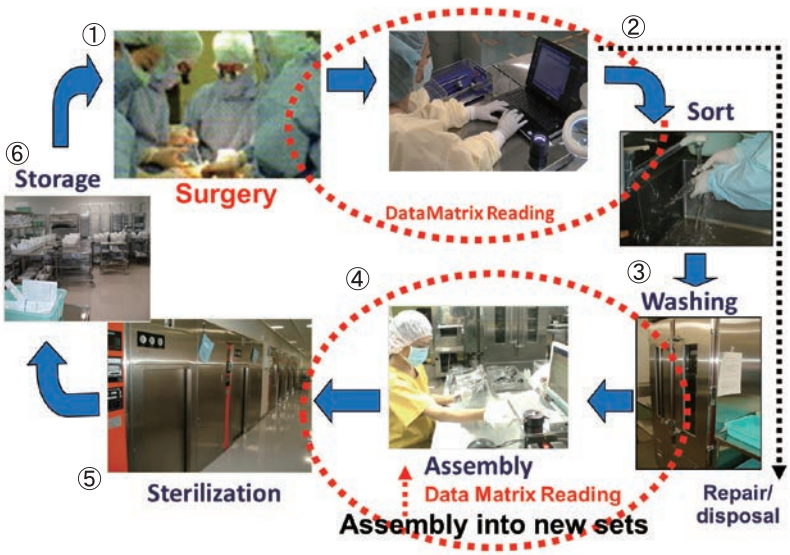
	As of September, 2013	As of September, 2012
GTIN-13	98.8%	99.1%
Registered to MEDIS-DC Database	75.5%	80.0%
BarCode on Individual Package	81.6%	81.1%
BarCode on Inner Package	96.1%	97.6%

(*1) Inner Package refers to the package that contains a fixed quantity (does not change on order) of individual packages of the same product.
(*2) Outer Package refers to the package that contains a fixed quantity (does not change on order) of inner packages of the same product.
(*3) Within the category of the specially designated maintenance management required medical device, marking on individual package is voluntary for large medical devices such as the installation-controlled medical device (i.e. "Installation-controlled medical device" stipulated in Article 93, Paragraph 1 of the Enforcement Order of the Pharmaceutical Affairs Law).
(*4) Out of the consumable supplies other than medical devices, pharmaceuticals for medical use are not subject to the guidelines.

Fig. 5.1.2.3-1 Surgical instruments

department. At the time, the hospital used its own data structure. In 2012 as the next step in the development of a traceability system, the hospital introduced the management and operation of surgical instrument by direct marking using GS1 standard identifier GIAI (Global Individual Asset Identifier). This enabled the hospital to ascertain how many times an endoscope instrument had been used for a surgical procedure. The system expanded to enable the management of replacement orders and amortization. This new system is comprised of two systems that are the core of the set assembly management process for endoscope components (integrated into steps ② and ④ in Fig. 5.1.3-1).

Fig. 5.1.3-1 Process-flow of Surgery, Washing & Sterilization for Surgical Instruments



① Endoscope is used in OR. After surgery, used and unused components are separated.

↓

Instruments are collected and undergo basic washing by the central sterile supply unit.

↓

② GS1 DataMatrix symbol on used components is scanned. <Component Use History Management System>

③ Washing and drying process.

④ GS1 DataMatrix symbol on components is scanned and components are set in a sterilized container.
<Set Assembly Management System>

⑤ Sterilization process.

⑥ Storage by each sterilized containers.

⑦ Returns to ①.

(1) Component use history management system
The first system is a use history management system for endoscope components.
Immediately following a surgery, used components and unused components are separated. GS1 DataMatrix symbol on used components are scanned after preliminary washing in a central sterile supply unit. By scanning the components immediately after a surgery, the number of time of uses for individual component is recorded. By accumulating this data as component use history, it is possible to trace a component's surgical procedure use history at any time. Furthermore, on-screen alerts are displayed for components that exceed a preset number of uses, which enables the hospital to respond accordingly in terms of disposal, replacement, etc.

(2) Set Assembly Management System
The second system is a set assembly management system for endoscope components. With this system, following washing and prior to set assembly, the GS1 DataMatrix symbols on components are scanned to update and check the number of sterilizations and number of uses. On-screen alerts are displayed for components that exceed a preset maximum number of sterilizations.

Migration to GIAI, a global standard identifier

The system in use since 2007 used the hospital's own serial numbers for instrument management but the new system incorporated the use of GIAI, the GS1 standard identifier. The reason for using these codes is to promote a globally accepted standard in the entire medical industry instead of using systems limited to any specific hospital. For example, if the sterilization process for endoscope components is being consigned to an external contractor, management using GIAI enables the simple and accurate identification of instruments and the departments of hospitals to which they belong as well as how many times an instrument has been sterilized or used. GIAI ensures the accurate redistribution of instruments to their respective owners (See Fig. 5.1.3-2).

GS1 DataMatrix symbol engraving

The engraving technology for GS1 DataMatrix symbols has advanced significantly since 2007 when the system was first introduced. The new traceability system took advantage of this technology advancement in various aspects including reduced 2D symbol size, higher reading performance and more varied marking substrate options.
In terms of the size of GS1 DataMatrix symbol engraved on instrument, it was set to minimum size 0.95mm x 2.80mm, maximum size 2.8mm x 2.8mm and the total character of 26 digits. This enables GS1 DataMatrix symbols to be engraved on the small tubes, leads, loop electrodes, and other components that comprise the endoscope.
In regards to reading performance, the scanning of the GS1 DataMatrix symbol took time in the former system, but the new system features a high-performance reader that eliminates this problem.
As for the marking substrate, the hospital marked 2D symbols only on stainless steel but the new system expands the choice of substrate toward other materials including titanium alloy, ceramics, and plastics (white/black). As with traditional surgical instruments, the symbol is engraved on both the front and back of each instrument in order to improve scanning efficiency.

Effect of new system

The introduction of this new system resulted in a framework that provides traceable instrument history data. This enables the hospital to identify what component from a specific container was used in which surgical procedure. Additionally, the achieved visibility of the number of uses and the number of sterilizations for endoscope components in a sterilization container has provided the following benefits. First, data on the number of uses for each sterilization container enabled the identification of sterilization containers that were being used in every surgical procedure and those sterilization containers that were barely being used at all. This showed the need to reevaluate inventory and procurement plans for sterilization containers retained by the urology department. Second, data on the number of uses for each component enabled accurate assessments of the number of uses for all components, including the identification of components always being used in surgical procedures and unused components. This helped clarify replacement and procurement timing

Fig. 5.1.3-2 GS1 Standard – Global Individual Asset Identifier

GIAI – Global Individual Asset Identifier		
AI (Application Identifier)	Data Field Content	Format
8004	GS1 Company Prefix + Individual asset reference	(n4+an...30) <Variable length: up to 30 alphanumeric characters>

for components in sterilization containers, which in turn has led to accurate inventory management.

Future outlook

The hospital is planning to expand the use of the endoscope management system beyond the urology department to include other departments and other medical equipment. They are working toward the total optimization of hospital asset management. This initiative contributes not to any single hospital but to the entire medical industry. We expect that many more medical institutions will come to understand the importance of medical instrument traceability management and that they will gradually move toward undertaking this initiative.

5.1.4 GS1 Healthcare Japan

5.1.4.1 History : Aiming for prevention of medical errors ensuring patient safety

The healthcare industry throughout the world has been taking various steps to prevent medical errors and in-hospital infections to ensure patient safety. In addition, this global industry has recently recognized the importance of exactly identifying the types of drugs, medical devices and materials used in manufacturing, logistics, diagnosis and treatment, and in the collection of these products so as them to prevent errors and increase the efficiency of healthcare services. Responding to this situation, GS1 has been holding biannual international GS1 healthcare conferences with the cooperation of healthcare organizations all over the world.
In October 2008, the first GS1 Healthcare Conference in Asia took place in Tokyo, Japan. This conference featured lectures on activities for standardization by regulatory authorities and industry groups from various countries and on the pioneering initiatives of medical institutions and medical device manufacturers.
Reports on the traceability management system for steel instruments adopted by Japanese medical institutions and on endoscopes developed by Japanese manufacturers were highly rated by the participants.
With the recognition that this international conference held in Tokyo greatly increased interest in GS1's healthcare activities throughout the Japanese healthcare industry, GS1 Healthcare Japan was founded in May 2009.

5.1.4.2 Goal and members

The goal of GS1 Healthcare Japan is to achieve patient safety by preventing medical errors using GS1 Standards. Traceability in medical scene as well as efficient logistics and administrative operations will be achieved through the efforts. With the close cooperation of trade associations, government offices and other organizations, GS1 Healthcare Japan will contribute to the overall development of the healthcare industry by conducting various projects using product identification with barcodes, 2D symbols and RFIDs to promote standardization and implementation. As of August 2014, GS1 Healthcare Japan has 36 corporate members, 27 individual members, 17 trade associations and 22 supporting members.

5.1.4.3 Activities

The main activities of GS1 Healthcare Japan are as follows:
1) Standardization and research activities

Fig. 5.1.4.3-1 Governing structure of GS1 Healthcare Japan

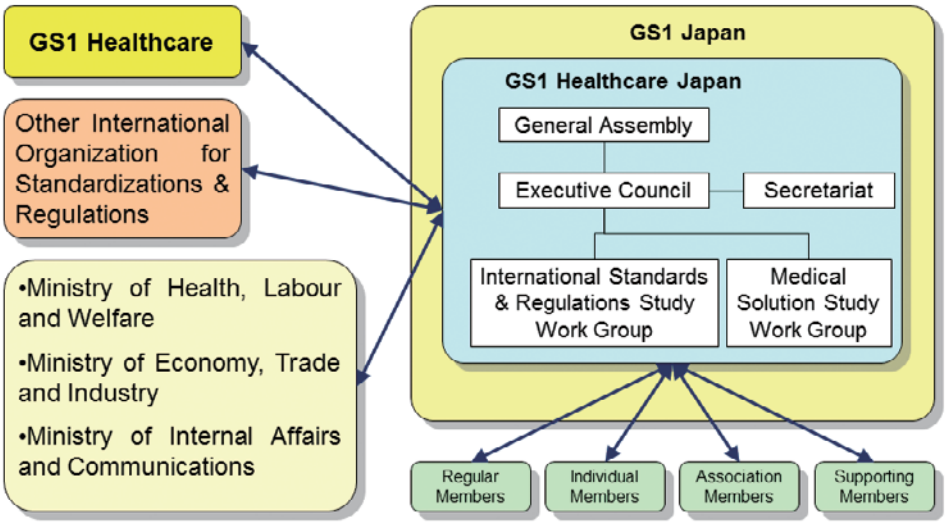


Fig. 5.1.4.3-2 General Assembly

Fig. 5.1.4.3-3 GS1 Japan Delegation team

- Investigating optimal product identification for medical devices and materials.
- Investigating optimal product identification for regulated pharmaceuticals.
- Investigating optimal means of ensuring healthcare safety at medical institutions using automatic data capturing.

2) Exchanging information with manufacturers, wholesalers, medical institutions and regulatory organizations

3) Make proposals to government agencies, utilizing the above mentioned information. Beginning in the summer of 2009, GS1 Healthcare Japan had started holding four work group meetings. The scope of these groups was as follows:
   1. AIDC Work Group: to research and discuss the utility and issues of GS1-128 for business systems in the healthcare sector.
   2. RFID Work Group: to investigate optimal use of RFID tags in the supply chain between manufacturers and wholesalers.
   3. International Work Group: to draft the proposal for the International Medical Device Regulators Forum (IMDRF) public comments on Unique Device Identification (UDI)
   4. Medical Device Marking Work group: to draft the guideline for marking 2D symbols on steel medical instruments.

In 2013, the Work Groups are reformed into two new Work Groups: as follows;

1. International Standards & Regulations Study Work Group keep watching international trends and work with MHLW to facilitate introduction of medical safety system to medical facilities.
2. Medical Solution Study Work Group
   Let medical service providers aware of importance of GS1 system for facilitating implementation parallel with the lobbing activities.

5.1.4.4. Other activities

Dr. Chikayuki Ochiai, chairperson of GS1 Healthcare Japan, serves as the head of a committee involving healthcare traceability under an industry supported NPO named JUMP (Japan Usability Medical Information Promote Conference). GS1 Japan works for the committee as a technical adviser. The committee developed three requirements in order to promote the traceability system for entire medical industry in FY2014, namely 1) stipulation of the law for the implementation of healthcare traceability, 2) promotion of standardization using GS1 standards, and 3) establishment of a network system that covers all of Japan. The requirements were submitted as a policy recommendation to the government in April of 2015.

5.2 Mobile

5.2.1 QR code for promotion.

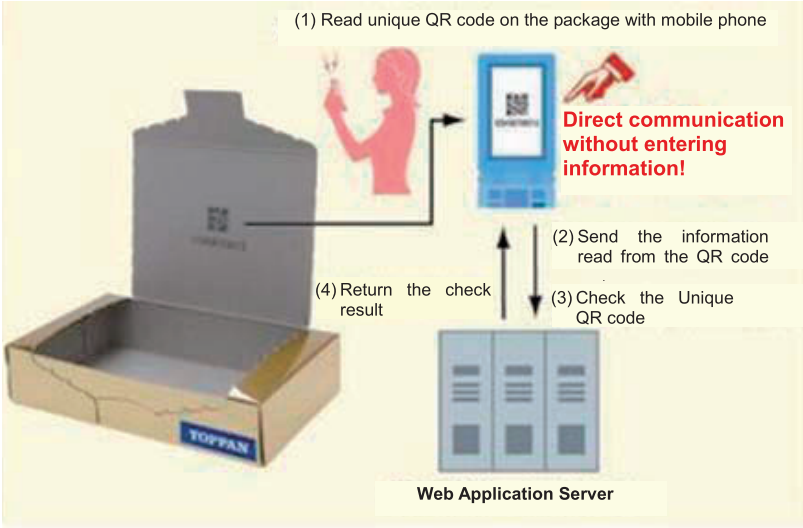
The QR code is widely used in the Japanese market. One of the key applications is promotion activity. Consumers access mobile sites by scanning the QR code on a product's package. They can apply for a specific promotion and obtain product information. The following is an example of promotion.

The Unique QR code is a QR code with a unique serial number. Toppan Printing Co., Ltd. has made it possible to print unique QR codes directly on the packages of individual products. Unique QR codes are being printed inside the packages of confectionery, beverages and other products and are being used as proof of purchase in prize promotions using mobile phones by leading manufacturers such as Meiji Co., Ltd., Kataoka & Co., Ltd., Ajinomoto Co., Inc.

When consumers read these unique QR codes with their mobile phones, they can access the prize promotion website where their serial numbers are automatically entered in prize drawings. Consumers can easily participate in prize promotions without needing to manually enter the website URL and serial numbers.

Fig. 5.2.1-1 Products using unique QR codes

Fig. 5.2.1-2 Image of Unique QR codes usage



A unique QR code can be used to limit participation to only one submission per number, as the unique number for the package is recorded in the system, which would invalidate repetitive use of the same number. Toppan Printing Co., Ltd., which also provides secretariat services for prize promotions, has confirmed that participants in promotions using unique QR codes are almost twice as many as those in similar promotions that require the consumer to key enter the unique number.

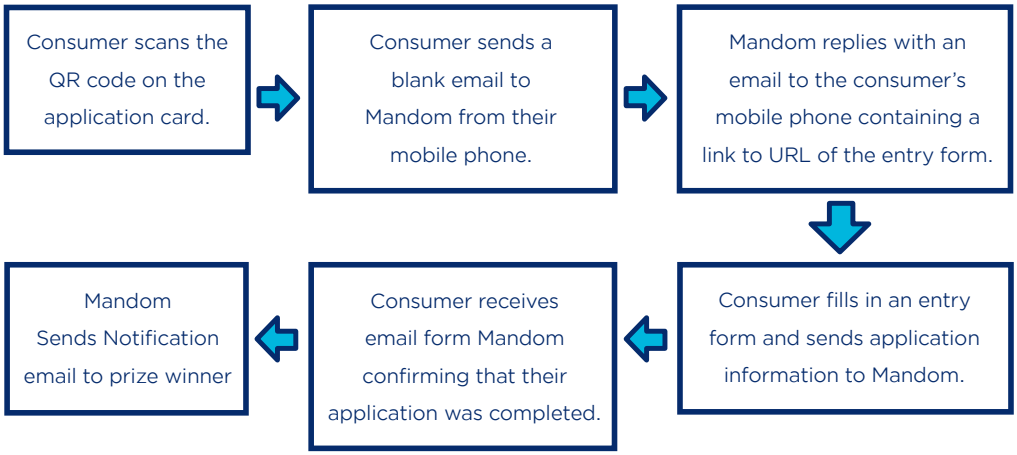
5.2.2 GS1 Extended Packaging Data Structure Solution

5.2.2.1 GS1 Extended Packaging data solution for promotion

Mandom, a manufacturer of men's cosmetics, ran a marketing campaign with a drug store chain in 2012. The company used a QR code to capture a URL that was scanned by smartphones and other mobile devices, and the URL was composed of the company's URL and GTIN of the product. The URL's data string is the same as defined by GS1 Extended Packaging. Products

Fig. 5.2.2.1-1 Promotion application card

Fig. 5.2.2.1-2 Process flow of mandom's promotion

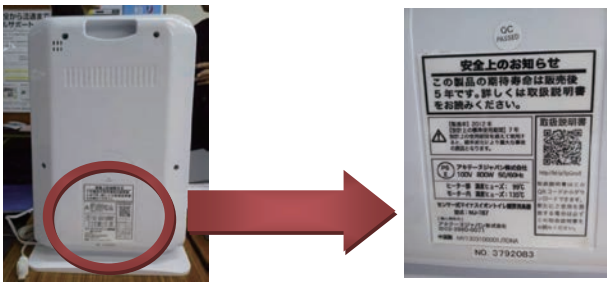


targeted in the campaign were seven types of men's hair waxes. The company inserted a card containing URL+GTIN QR Code and instruction to join the promotion in the product package. Mandom thought that it could efficiently obtain information on consumers who participated in the campaign by the specific products they bought.
Before using this QR Code, Mandom had run its marketing campaigns by postcards. The company acknowledged that the time and trouble to fill in a postcard and the cost of a stamp were not attractive to consumers, and this resulted in low participation rates. They found that the campaign increased the number of applicants. The data structure facilitated tasks of checking and summarizing the participation results by GTIN. Hiroto Furuya, Publicity and Sales Promotion Department, Mandom, commented on this campaign. "When I first learned about GS1 QR Code, I knew immediately that we could use it for our sales promotions. A particularly attractive advantage is that the new data format of the QR code includes a unique GTIN linked with a product. We can analyze the information in combination with store POS data during the campaign and the data can be used for post-sales marketing analysis. We are always looking for new sales promotion methods, and hope to continue to find ways to extend the use of the method in the future. We feel that the GS1 QR code has great potential. We expect that specialized software for reading GS1 QR codes will be developed soon."

5.2.2.2 GS1 Extended Packaging data solution for secondhand goods

The secondhand goods' market is growing in Japan. It is important for brand owners to make user manual accessible for those who buy secondhand goods. However, user manuals are sometimes lost.
The Japan Technical Designers Association (JTDNA) (*1), conducted a pilot in 2013 using the QR codes to meet the Product Liability requirements. The aim of the pilot was to provide user manuals to secondhand users. The pilot used conventional QR codes because some mobile phones were not yet capable of reading GS1 QR Codes. The products used for this pilot were not assigned a GTIN. The brand owner encoded the company URL and product code. Users could obtain the user manual in PDF format by scanning the QR code on the product body. The manual was specially designed to be small sized data for the phone to download, and the information was easy to read on a smartphone display.
The mobile manual was verified by JTDNA in advance and carried a certification mark for the predefined quality.
In the Japanese market, as a national policy for consumer protection, the government accelerates

Fig. 5.2.2.2-1 A label with QR code



mandatory recalls, and voluntary recalls, if a product has suspected defects or other features that might adversely affect consumer safety and security. It is plans to share product's safety information by using smartphone.
In 2015, another member company plans to introduce a product with the QR code. The product is equipment for power shutdown. The company will print the GS1 QR on the product. The QR Code is intended to be used for the two purposes; manual retrieval and registration of user information. They plan to sell about one million units. We expect that this product will showcase the usage of GS1 QR Code and Extended Packaging application in Japan.

5.2.2.3 Promoting GS1 Extended Packaging solutions and other activities

In order to promote the Extended Packaging solution, we need to demonstrate its value by showing examples of how it works and helps brand owners communicate with consumers to potential users. At the same time, it is essential to explain what the reading software needs to do to encourage solution providers to develop marketable applications. We have been asking solution providers to develop reading software for GS1 QR Code.
We are also conducting other related activities. Promoting GS1 QR's usage for user companies is important for GS1 QR. To do so, we conduct three activities. One is a seminar. We have been organizing a mobile seminar since 2010. The topics at the seminar have included GS1 B2C Standards Development and Benefit of GS1 Extended Packaging for consumer goods promotion. More than 100 people attended the seminar in March 2015. The second activity is an industry exhibition. We participate in several industry exhibitions including the Retail Technology Exhibition and Wireless Communications Exhibition. On every

(*1) The Japan Technical Designers Association (JTDNA) is the only specified nonprofit corporation in Japan that examines and evaluates the quality of user manuals.

Fig. 5.2.2.3-1 Image of GS1 QR code reader program

Fig. 5.2.2.3-2 Promotional brochure

occasion, the Extended Packaging solution is explained using the demonstration software. The third activity is a flyer. We renewed the flyer explaining the business cases of Extended Packaging application in 2014.

5.3 Food Safety

Recently, the food industry has been facing higher demand for food safety as well as fiercer competition. Consequently, it is increasingly required to understand and provide an unprecedented high level of detailed information about food products. Some companies and industries have responded by implementing food safety and traceability systems and building an operational systems using GS1 system. Here we will introduce some case examples of a traceability system that records transaction data for individual ID numbers mainly of beef using GS1-128 barcodes and GS1 keys and a food safety and traceability system that describes GTIN and relevant attributes (AIs) using GS1-128 or QR code in the processed food industry. For detail about QR code, please see 1.9 QR code.

5.3.1 Beef

After the outbreak of the BSE(Bovine Spongiform Encephalopathy) scare in 2001, securing the traceability of beef produced in Japan became a pressing issue. When the Beef Traceability Law took effect on December 1 2003, the traceability of domestically raised cattle was mandated. The traceability system encompasses supply chain businesses such as producers, slaughterhouse operators, packers, distributors and retailers.
Today, every one of more than 4 million cattle raised in Japan (cattle born in or imported live into Japan) is assigned a 10-digit individual cattle ID number by the National Livestock Improvement Center, a government affiliated organization that manages the national cattle database. Each beef cow wears two ear tags marked with this ID number. Information on each beef cow

Fig. 5.3.1-1 Japanese beef traceability system

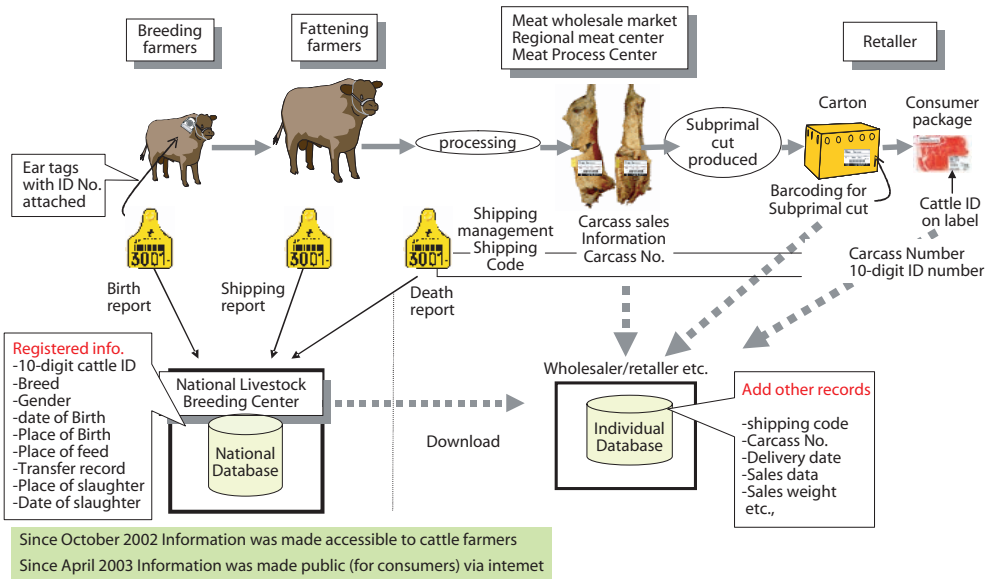


Fig. 5.3.1-2 Ear tag

Fig. 5.3.1-3 Standard distribution barcode label system for meat

including the gender, breed, date of birth, feeder's name, date of slaughter, is recorded and stored in the database.

When meat packers distribute their product (meat parts or sub-prime cuts) to wholesalers or retailers, they must include the cattle ID number on distribution label on the carton or shrink-wrapped package. The 10-digit cattle ID number is encoded in a GS1-128 barcode using AI (251) together with other information keys including GTIN (assigned by the packers), weight, production date, carton ID, and lot number. It is mandatory to display either the cattle ID number or lot number on a meat package sold to consumers at retail establishments. Most retailers display the cattle ID on the meat label. Retailers produce consumer package labels that state the cattle ID number in human readable numeric format captured from the barcode on the distribution label.

Consumers can trace information about the beef they have purchased using this ID number as a key on the website of the National Livestock Improvement Center. Some consumer package labels carry a 2D QR code prepared for reading by mobile phone users that contains a hyperlink to the national database website. This gives consumers an alternative way to access information about beef cattle, as the QR code can be read and decoded using many types of mobile phones sold in Japan.

The law also covers restaurants that specialize in beef dishes, such as sukiyaki, steak, and barbecue restaurants. These restaurants are required to clearly display the cattle ID or lot number of the beef used in the dishes served to customers.

Before the BSE issue arose in Japan, a standardized GS1-128 data format used as a distribution label for meat products (shown Fig. 5.3.1-3) had already been in place through a voluntary initiative in the meat packing industry. After the regulatory requirement took effect, the Cattle ID number was incorporated into the label later.

5.3.2 Pork and Poultry

A compulsory law like the Beef Traceability Law does not exist for pork and poultry. However, in spring of 2007, the meat industry introduced the GS1 Standard System for pork and Poultry and uses it in a similar way to the Beef Traceability Law to prevent transmission of infectious diseases to consumers and avoid the loss of sales opportunity.

5.3.3 Processed Food

One of the features of processed food manufacturers is the preparation of many raw materials, various manufacturing processes, and high-mix, low-volume production. For example, Kewpie Corporation, which produces processed foods such as mayonnaise and dressings, deals with approximately 800 kinds of raw materials and packaging materials. Also, the product attributes of these foods require tight safety controls, and employees are required to confirm safety procedures in various ways. Moreover, demands and responsibilities regarding safety and security have recently increased, such as the introduction of HACCP, establishment of traceability, response to allergen description labeling, and increased items of information to provide in product specifications. For example, Tsukishima Foods Industry Co., Ltd., which deals with raw materials including margarine, shortening, and purity lard, has increased its number of employees engaged in quality control and assurance 20 times in 20

Fig. 5.3.4-1 Operation changes

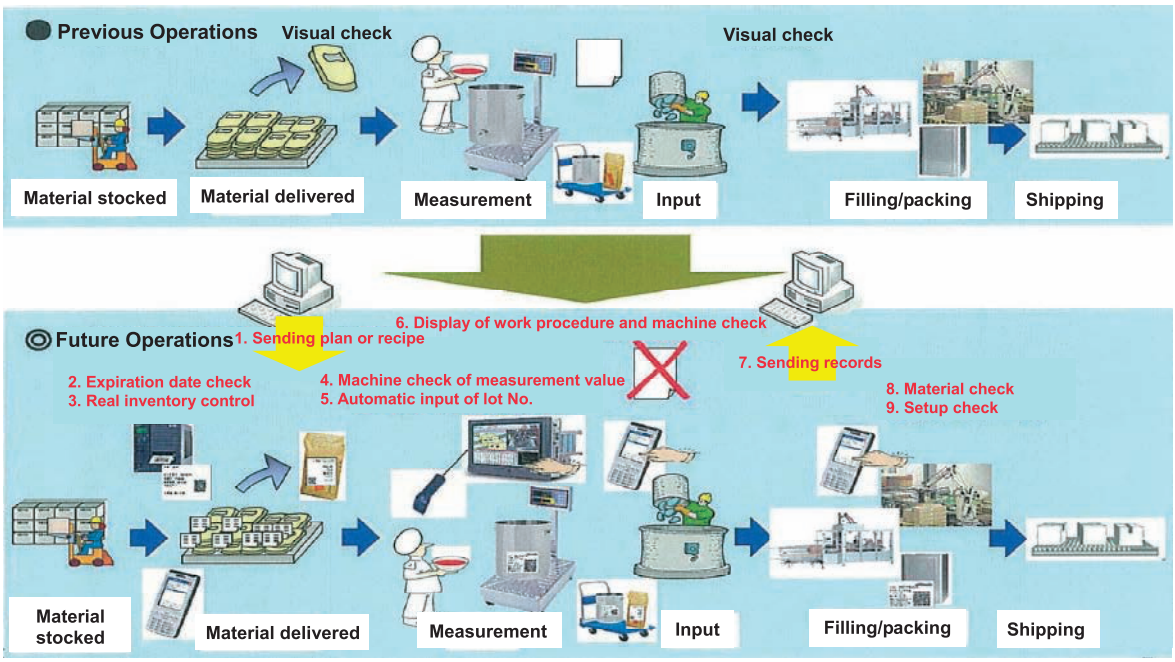
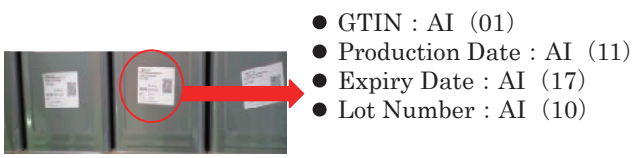


Fig. 5.3.4-2 Encoded information



years.
Processed food and food material manufacturers urgently need to implement systems to respond to the above-mentioned business environment. Here we will introduce case examples of food safety and traceability systems using GS1 AIs encoded in GS1-128 or QR code.

5.3.4 System Outline

Processed foods are manufactured by combining various raw materials. It is critical to prevent raw material combination errors and the use of expired raw materials. For this reason, GS1 Japan published traceability guidelines for material and processed food manufacturers. When manufactures receive and stock materials, they produce a label with a GS1-128 or QR code carrying information of the material according to the guidelines. The material name, manufactured date, expiry date, lot number, etc. are encoded using AI. When combining materials, workers can prevent raw material combination errors and the use of expired raw materials by scanning this barcode with a hand scanner. Storing work records scanned with a hand scanner enables traceability. In addition, since actual inventories including the expiry date, lot number, etc. can be identified using the data, it is possible to achieve proper inventory levels and reduce costs.

5.3.5 Adoption in the Upstream Supply Chain

This system was originally used by manufacturers on a voluntary basis by attaching barcodes to stocked products to prevent combination errors in their own factories. Later, barcodes were also attached to shipping products not only to prevent combination errors but also to be used for traceability purposes. At the same time, companies have widely encouraged their suppliers to print the barcode on products to be delivered according to the same rules so that they would not have to produce and to attach barcodes to other companies'products. As a result, this information display system has now been used extensively not only by manufacturers of end products but also in the supply chain upstream. In other words, food safety and traceability systems limited to a single company's internal procedure have been developing into a food safety and traceability system for the entire supply chain in a broad sense.
For example, the processed food manufacturer Kewpie Corporation requires suppliers that deliver materials to the company to print the barcode on products according to the same rules. The numbers vary by factory, but approximately 30 to 50 percent of suppliers deliver products to which QR codes including GTIN and relevant attributes are attached as requested by the company. The raw material manufacturer Tsukishima Foods Industry Co., Ltd. has decided to implement the

system requested by the company to which it delivers materials. As a result, Tsukishima has worked toward implementing food safety improvements and cost reductions, as well as establishing traceability in a supply chain made up of several companies, by shipping materials with labels carrying QR codes including GTIN and relevant attributes. Tsukishima has also encouraged its own suppliers to implement the system and it has been used extensively further upstream in the supply chain. GS1 Japan is planning to update the guideline to expand the scope of food traceability and improve its quality to show the usage of GS1 standards in the supply chain upstream.

5.4 Billing System

A public utility charge collection service was initiated by Seven-Eleven Japan Co., Ltd. and Tokyo Electric Power Company in October 1987, after GS1 Japan at the time established a code system using EAN-13 symbols in the same year.
Subsequently, most of the Japanese convenience store chains have joined and the system has been expanded to include gas bills, telephone bills, insurance fees, broadcasting fees, water bills, credit bills, mail-order bills, national pension premiums, and various tax bills. The number of bill issuers has reached a figure of 8,000

Fig. 5.4-1 Sample payment slip

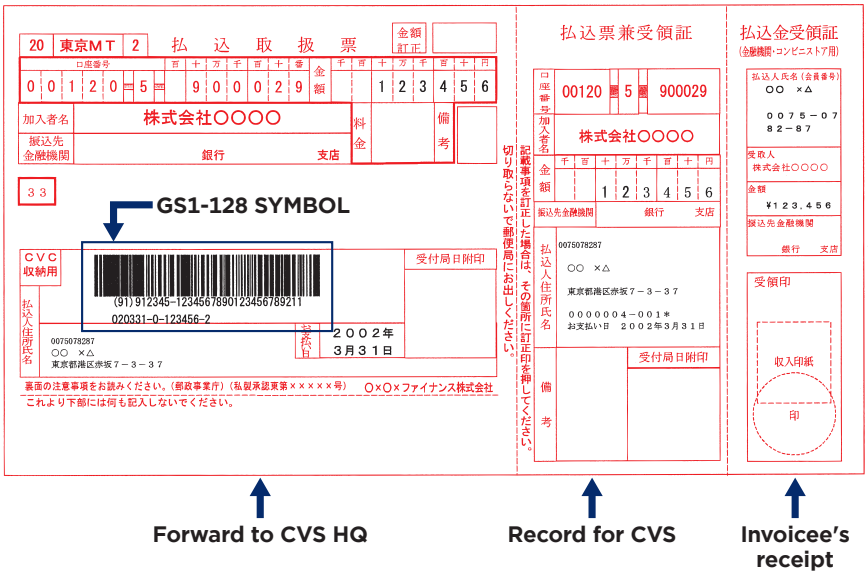


Fig. 5.4-2 Code structure (44 digits) for payment slip

(91)	MMMMMM	EEEEEEEEEEEEEEEEEEEEE	R	YYMMDD	F	PPPPPP	T
①	②	③	④	⑤	⑥	⑦	⑧

	Data item	Content	Number of Digits
①	(91)	AI (for data item)	2
②	MMMMMM	Second digit of company prefix (9 or 5) + company prefix (five digits)	6
③	E...E (21digits)	free use	21
④	R	Re-issue (times of re-issuance)	1
⑤	YYMMDD	Payment Due date	6
⑥	F	Postal tax indicator flag (0=not required, 1=necessary)	1
⑦	PPPPPP	Amount due (in Yen)	6
⑧	T	Check digit (modulus 10)	1

(including the service sector and public bodies), the number of convenience stores offering the service system is about 30 (over 40,000 stores), and the total collected amount exceeds JPY800 billion (USD 8 billion) / year in 2008. In 2013, the turnover from processing public utility payments collected at Japan's three largest convenience store chains (Seven-Eleven Japan, Lawson Japan, and FamilyMart) exceeded their turnover from merchandise sales, and the resultant increase in customer visits to the stores also contributed to greater sales. The initial system used 3 or 4 EAN-13 barcodes to encode the necessary information. To enable operation ease and efficiency, new system using single GS1-128 barcode was introduced in May 2001.

5.5 Promotion of GTIN in a new industry: Professional-use products (packaging materials for deli and fresh food).

GS1 Japan proactively promotes the implementation of GTIN in the field of professional-use, non-retail products.
Packaging materials for food, such as containers for bento (boxed lunch) and deli food and trays for fresh meat and fish are professional-use products, which consumers would not normally purchase in retail stores with some exceptions. The users of these products are retail stores, such as supermarkets and convenience stores, food processing companies, food-service companies, etc.
With the growing needs of GTIN source marking for these products, GS1 Japan launched a working group, the members of which include manufacturers and wholesalers in the industry, in February of 2014.
The following points have become clarified through discussions in the working group.

i. Low source marking rate
   The source marking rate is only approximately 50% of the products handled by wholesalers. Unless you are a major manufacturer using barcodes to manage internal products, businesses cannot do acceptance/delivery checking or manage inventory with barcodes. Visual inspection is the common practice. Each company also matches and converts proprietary identification numbers when issuing or receiving product orders, and both manufacturers and wholesalers strongly desire smooth order issuance/reception using standardized codes.
ii. There are many types of products, and many of them are difficult to visually determine
   In addition to food containers, there are many types of products being handled in this industry, such as bags like plastic bags, shopping bags, etc., paper napkins, disposable chopsticks, wrapping films, stickers/labels, wrapping paper, sanitary goods like gloves, detergent, etc. In addition, many products are very similar in name and appearance, making it difficult to visually determine. This causes great workload in the inspection work.
iii. Product unit patterns in transactions between companies that differ depending on products and incorrect barcode labeling
   With most products, 2 units, including the bag unit and case unit, are the product units used in transactions between companies. However, these patterns are not applied to some products. When we conducted a research on barcode labeling, we found only a part of products were marked at source (both bag unit and case unit require barcodes but often either is marked). In addition, we also found barcode labeling that seemed difficult to be scanned, such as red barcodes and those with only bars printed on clear bags, etc.

Based on characteristics and issues of the industry, such as the above items, the working group considered the contents of GTIN source marking guidelines and completed the guidelines exclusively targeting the industry in February of 2015. These guidelines are expected to streamline the industry's distribution and promote EDI in order issuance/reception by improving the industry's source marking rate.

Fig.5.5-1 Specific examples of packaging materials: Bento container (left), fresh meat trays (center), products that are difficult to visually determine (right)

6. Community Engagement

6.1 GS1 Japan Partners

On April 1, 2015, "GS1 Japan Partners" mainly consisting of solution providers was established as a new membership scheme by integrating 4 membership programs previously existed in GS1 Japan. (Fig. 6.1-1)

6.1.1 Objective of the establishment

GS1 Japan Partners was established with the aim of sharing information, such as the latest system technologies, information systemization examples, industry trends, international trends, etc., and promoting information systemization in the overall retail businesses with the focus on the keywords "GS1 Standards", "EPC", "EDI", etc., "with more open communication by integrating 4 membership programs.

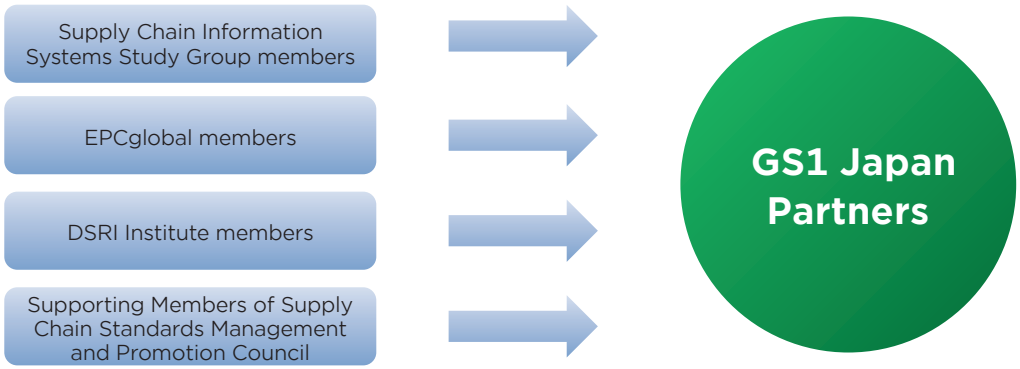
6.1.2 Service overview

Major membership services are as follows.

- Regular seminars
- Special seminars
- Tours of various domestic and international facilities
- Provision of materials/information and introduction of various events

GS1 Japan Partners is scheduled to further deepen information linking/sharing, aim to disseminate and expand GS1 Standards, and provide various additional services required to support the activities of member companies by integrating a membership system, which was organized based on different themes.

Fig. 6.1-1 GS1 Japan Partners



6.2 ICT-Oriented Wholesale Industry Group

In 1985, we set up a study group aimed at promoting computerization of the wholesale industry with GS1 Japan as its secretariat. In Japan's supply chain system, wholesalers play a major role as most manufactured products are delivered to retailers through wholesalers. The study group is operated primarily by wholesalers dealing in FMCG in different industries (foods, pharmaceutical products, etc.), and the membership is currently about 40 companies.

The group is divided into several sub-working groups according to theme of members' interests, and each hold monthly meetings. There are other activities including an annual forum, which is the biggest event, and future solution study tour.

With its mission of "establishing the foundation to lead to the future figure of wholesale information systems", the study group worked on the following 5 topics in FY2014.

- Use of Ryutsu BMS in line with the guidelines
- Utilization of smart devices
- Utilization of Cloud
- Cost reduction and human resources development in information systems
- New technologies for wholesale distribution systems

Fig. 6.2-1 ICT-Oriented Wholesale Industry Forum

6.3 Information Systems in Food, Beverage, and Alcohol Industry Group

This study group is a voluntary group of liquor and processed food businesses established in 1983 with the aim of studying the most appropriate information systems for use between food producers and wholesalers. It is important for members to cooperate with wholesalers, as they are positioned between retailers and product manufacturers. Therefore, the study group has a system for continuous consultation with the Japan Processed Foods Wholesalers Association, a national organization of processed food wholesalers. The study group has about 60 corporate members that are representative of Japan's processed foods, marine products, and liquors businesses. GS1 Japan serves as the group's secretariat.
The study group conducts joint studies on new issues concerning standardization of B2B data exchanges among companies in the supply chain. It holds regular meetings four times a year where best practices are introduced. It also organizes seminars on the latest topics by invited outside lecturers and study tours to pioneering businesses. The group also serves as a place for gathering and summarizing the opinions of those in the industry.

6.4 The Collaborative Council of Manufacturers, Wholesalers, and Retailers

The Collaborative Council of Manufacturers, Wholesalers, and Retailers was formally established in May 2011 for the purpose of improving industrial competitiveness and contributing to an affluent standard of living for the nation's citizens through extensive innovations and improvements of supply chain management. The Council's Vision states the objectives of the activities of this collaboration of the retail supply chain stakeholders. Member companies participate the Council based on the endorsement and support of the Vision by their executive management and agreement to act upholding the Vision.
GS1Japan and the Distribution Economics Institute of Japan jointly serve as the secretariat of the Council. Under the auspices of both Institutes, 15 founding member companies have participated and continued to hold preparatory meetings since May 2010. They discussed the adoption of the Vision and how to manage the full-scale activities of the Council with the active support of the Ministry of Economy, Trade and Industry (METI). They also established working groups and continued discussions on three specific themes, "Reducing Returns", "Optimizing Deliveries", and "Promoting the Introduction of a new EDI standard known as Ryutsu BMS". The founding companies announced the formal establishment of the Council in the "Collaborative Forum of Manufacturers, Wholesalers, and Retailers" in May 2011.
In FY2014, 2 working groups addressed the following topics.

The first one is the Processed Food Working Group. This working group is scheduled to promote continuous implementation result reports on returned product reality investigations, follow-up result reports on returned product reduction implementation plans in various companies, extension of expiration dates/ marking of the month and year, progress reports on delivery due revisions, reports on transportation optimization examples, etc.

The second one is Daily Commodity Working Group. This working group is scheduled to promote continuous implementation result reports on returned product reality investigations, in which OTC pharmaceutical products are added to the conventional daily commodities, follow-up result reports on returned product reduction implementation plans in various companies, summary result reports on various initiative examples toward returned product reduction, reports on transportation optimization examples, etc.
The Council reported its output at the "General Meeting" and
The Collaborative Council of Manufacturers, Wholesalers, and Retailers has a four-tier structure consisting of a general meeting, strategic meeting, steering committee, and working groups.
Forum of the Collaborative Council of Manufacturers, Wholesalers, and Retailers" in July 2015. The executive management of each company confirmed their responsibility for their activities and will lead specific on-site improvements and innovations within the company.

Fig.6.4-1 General Meeting and Forum of The Collaborative Council of Manufacturers, Wholesalers, and Retailers

7. User Support

7.1 Promotional and Training Activities and Consulting

GS1 Japan provides a variety of seminars intended mainly for companies that have acquired GS1 Company Prefix. The participants at these seminars include retailers and wholesalers, manufacturers, and Solution Providers. Among others, the following seminars are held regularly:

- Barcode Basics
- Introduction to EPC/RFID
- Barcoding medical device
- Introduction to Ryutsu BMS

The "Barcode basic" is an introductory seminar to promote the GS1 standard item identification code and data carriers. This seminar is regularly held in Tokyo, Osaka and other major urban areas and is wellreceived. The main participants include information system engineers in operating companies that have newly acquired a GS1 company prefix, manufacturers, wholesalers, retailers and IT firms. Throughout 2014, more than 1,000 individuals took part in this seminar.

The "Introduction to EPC/RFID" has been regularly held mainly for beginners to enable them understand how to optimize work processes using electronic tags. Held every two months in Tokyo or Osaka, this course explains the features of electronic tags, presents case studies on electronic tag system users, EPCglobal standards and other topics. In addition to classroom lectures, the course provides demonstrations of group reading of electronic tags for shipping and receiving inspections and hands-on experience of electronic tag reading.

The "Barcoding medical device" started in April 2010, following the establishment of GS1 Healthcare Japan. This course explains the rule of the barcoding medical devices based on the notification issued by the Ministry of Health, Labour, and Welfare, and is for pharmaceutical companies, medical equipment manufacturers, wholesalers, hospitals, and solution providers.

Fig. 7.1-1 Barcode Basics

Fig. 7.1-2 Barcode scanning experience

Fig. 7.1-3 Introduction to EPC/RFID

Fig. 7.1-4 RFID tag reading experience

The "Introduction to Ryutsu BMS" is intended for system engineers in the distribution industry, companies considering the introduction of Ryutsu BMS, and companies that support the introduction of Ryutsu BMS.
Held monthly in Tokyo and quarterly in Osaka, this course covers the fundamentals of EDI, Ryutsu BMS implementation procedure, and benefits of using Ryutsu BMS etc.
In addition to the regular seminars intended for promotion and training, GS1 Japan holds various events including:

- Annual Seminar
- EPC RFID forum
- Ryutsu BMS Forum And Expo
- Mobile Seminar

These events are held every year and are open to general users.
GS1 Japan also provides consulting on the registration and use of the GS1 Company Prefix, printing of symbols, GTIN allocation rules, GLN and EPCglobal standards, standard EDI and other issues.

7.2 Publications

GS1 Japan publishes a variety of printed publications that deal with GS1 system operations and summarize SCM-related studies in Japan to provide information to domestic retailers, wholesalers, manufacturers, and IT firms. Our currently available publications include:
Trends in distribution information systems 2014–2015
GS1-128 Guide – Application identifier and its use
Barcode Fundamentals – GS1 international distribution standards for beginners Operation standards manual for GS1-128 barcode standardization of prescription drug
DataBars GS1 Japan has also been publishing the "Distribution and System" quarterly bulletin since 1974 and the "Distribution Development Center News" bimonthly brochure since 1982. These periodicals address studies on the latest in distribution systemization such as the GS1 standards system, barcode systems, EDI, SCM, RFID, EPCglobal network system, and databases, as well as industry standardization, policy trends, and progress in international standardization.
GS1 Japan produces video contents covering GS1 systems (including GTIN, JAN code, ITF symbol, GS1-128 barcode, GS1 DataBar, RFID, EPCglobal network system and others). They are used in the abovementioned seminars and can be borrowed free of charge.

8. Supporting Information System Adoption by Neighborhood Shopping Streets

GS1 Japan has been carrying out a project to promote information system adoption by local shopping streets. These areas consist of small and mediumsized merchants with limited financial resources compared to major retailers. Information systems require high initial investment and substantial running costs. Sometimes they also require a full-time administrator or the help of IT professionals to ensure their smooth operation. Therefore, it is often difficult for a neighborhood shopping street to introduce a system on its own. They also lack financial and human resources for gathering information on best practices in other shopping streets. Despite these challenges, a small number of shopping streets have successfully introduced and are benefiting from information systems that are low cost and easy to run (minimal human resource burden on merchants), and have low barriers for introduction.

Therefore, GS1 Japan is conducting a study of various information systems that provide streamlining and greater efficiency to shopping streets. The results of this study are being provided to other shopping streets to help with their revitalization.

Specifically, the following research is being carried out.

(1) Gathering information on cases of shopping streets that have implemented information systems that are remarkable or have a lot of future potential

(2) Study into the background of the gathered cases, their histories, current conditions, and issues

(3) Presentation of the above cases to shopping streets and regions looking to implement information technology, or to organizations such as chambers of commerce supporting small and medium-sized businesses

GS1 Japan is not only exploring individual shopping street cases as explained above, but also holds events to provide information to those involved with shopping streets nationwide. Each year, GS1 Japan holds a Shopping Street Forum and shopping street stakeholders directly provide details of successful initiatives.

In FY2013, GS1 Japan launched the Review Committee for Shopping Street Information System Promotion, made up of shopping street managers actively working towards the introduction of various information systems, as part of this project. The purpose of the committee is to analyze the pros and cons of effective shopping street information system cases, and the potential for applying them to other shopping streets. The aim is to facilitate the introduction of these information systems across Japan, and provide assistance for overcoming challenges.

Through these kinds of efforts, GS1 Japan is helping to promote the introduction of information systems by local shopping streets.

Fig. 8-1 Togoshi ginza street shopping district

9. The History of GS1 Japan

9.1 Overview

GS1 Japan was founded in 1972 mainly through the efforts of the then Ministry of International Trade and Industry (present Ministry of Economy, Trade and Industry or METI) as the Distribution System Research Institute (DSRI), a non-profit organization for promoting the introduction of distribution systems and rationalizing and increasing the efficiency of supply chains. At first, the institute conducted studies on the standardization of national product codes for apparel and grocery.
Following the move towards standardized symbols as well as product codes in the U.S. and Europe, the institute started working to build a system for standardized product codes and symbols in Japan. Then in 1978, it applied for participation in EAN Association and was admitted as the first member except European countries.
In the second half of the 1970s, GS1 Japan paved a way to adopt EAN system in Japan, starting with the introduction of EAN symbols into the Japanese Industrial Standards (JIS). Source marking was tested with cooperation from Kikkoman Corporation (a soy sauce manufacturer), Coca-Cola Japan, Kai Corporation (a cutlery manufacturer), while retailers began to conduct storefront experiments with POS system.
In the 1980s, Jusco Co., Ltd. (present AEON Co., Ltd.), Co-op supermarket stores and other retailers conducted pilots on the POS system. GS1 Japan held many seminars on EAN system and POS system throughout Japan and encouraged stakeholders to adopt source marking.
The important milestone for the widespread use of source marking was the fact that, in 1982, Seven- Eleven Japan, a convenience store chain, adopted POS system at all of its stores (which totaled 1,650 at that time, but are about 12,800 at present). Another factor contributing to the diffusion of POS system was the introduction of consumption tax in 1989. GS1 Japan created study groups for several industries in the 1980s and worked together with these industries to study how to improve their business process using computer systems. These industries included processed foods, sporting goods, consumer electronics, and books and magazines. A study group of wholesalers was also established by organizing representatives from different industries. These study groups soon came to cooperate in the adoption of EAN standards.
In addition, it is worth noting that GS1 Japan started the service for collecting and providing POS data and began to operate the Japan Item Code File Service (JICFS), the product catalogue, as early as in the mid- 1980s.
During the 1990s, GS1 Japan studied product codes, EDI messages and other subjects in cooperation with the apparel industry under METI-funded study of quick response (QR) system. Retailers used to assign their proprietary code to apparel products. Our joint study with the apparel industry led to the diffusion of EAN source marking on apparel products. It was also a landmark event when the GS1-128 was introduced for the labeling of crates containing various products delivered to department stores. The Japanese EDI messages, JEDICOS, based on the EANCOM was also completed around that time.
In the 2000s a new business model was established in Japan in which convenience stores acted as agencies for receiving public utility payments from customers. As the tool for realizing this service, the GS1-128 was adopted on the bills for the public utility charges. And the meat industry also decided to adopt the GS1- 128 for its standard labels for traceability. The second half of 2000s was characterized by the fact that the GTIN began to be used for the online music service, an intangible product, and that Internet and mail order companies started to adopt the GTIN for their product management purposes.
During the 2003-2009 period, GS1 Japan founded EPCglobal Japan and worked to solve the problems of introducing RFIDs tags into various industries (e.g., apparel, footwear, books, consumer electronics, international distribution) by supporting METI's RFID pilot programs and thus established the basis for the diffusion of RFID.
In 2009, GS1 Healthcare Japan was established as a voluntary group for promoting GS1 Standards in healthcare sector. This move can be regarded as the outcome of our pioneering activities after the late 1990s, including our publication of guidelines for the use of the GS1 System for medical devices in cooperation with the healthcare industry.In the area of EDI, GS1 Japan created an XML format EDI standard (Ryutsu BMS) for supporting domestic business practices and has worked to spread the standard together with 49 trade organizations.
There have been new developments in several recent years. As public interest in food safety has increased, GS1 Japan started a joint study with Japanese supermarkets and supply chain stakeholders on the use of GS1 DataBar including pilot testing of the symbol with discounted price or sell-by-hour information at retail stores. In addition, we have begun a study on the possibility of the service combining mobile communication with the GS1 Standards in cooperation with stakeholders in the mobile industry. DSRI celebrated its 40th anniversary in 2012.

9.2 Chronology

1972	DSRI (Distribution Systems Research Institute) established.
1973	Supply chain information network models developed.
	"Distribution and Systems Review" launched
1974	Uniform trade codes studied for each business category.
1975	Capacity building courses on Distribution systems started for both managers and system engineers
1977	Study Group for Supply Chain Information Systems established.
	GS1 Japan established (Previous name: DCC Japan).
	Allocation of common supplier codes started.
1978	Joined EAN International.
	EAN/UPC Symbol became Japanese Industry Standard
	Allocation of GS1 Company Prefix started.
1979	First POS pilot conducted at a supermarket in Tokyo.
1980	Japanese communication protocol for retail industry established.
	POS pilots conducted at AEON, Nada Coop.
1981	POS pilot conducted at a voluntary chain (SME).
1982	"DCC Japan Newsletter" published.
	7-11 Japan (convenience store) introduced POS.
1983	Low-interest financing for POS introduction provided to small and medium retailers by government.
1984	Study Group for Information System in Food, Beverage, and Alcohol Industry established.
	Study Group for ICT-Oriented Wholesale Industry established.
1985	Ryutsu POS Database Service (RDS) Project started.
	JICFS (Jan Item Code File Service) Project started.
1986	Ito-Yokado (GMS) introduced POS.
	Sporting Goods Information System Study Group established.
1987	Barcoding in magazine Industry started.
	ITF symbol become Japan Industrial Standard.
	Utility bills collection service system using multiple EAN-13 symbols established.
1988	Standard EOS system using GTIN-13 established.
	EAN International General Assembly held in Tokyo.
	UPC Company Prefix application service started.
1989	Consumption tax introduced.
	Research and pilots of POS for small retailers located in shopping street
1990	Barcoding in Book Industry.
1991	Multi-functional cards for regional shopping streets developed.
	Daiei (GMS) adopts EAN codes for all products.
1993	Heiwado (supermarket in Western Japan) adopts ITF.

1994	SCM (Shipping Carton Marking) /ASN (Advance Shipping Notice) with GS1-128 used for SCM label system guideline published.
1995	In addition to GS1 Prefix “49”, allocation of GS1 Company Prefix starting with “45” started.
1996	Study for computerization of trade for perishables started.
1996	Open Business Network (OBN) system developed.
	Code-128 symbol become Japanese Industrial Standard.
1997	CRP (continuous replenishment program) tested at Heiwado.
	Japanese version of EANCOM established.
1999	Study and Pilot for Supply Chain Promotion for Efficient and Effective Distribution System
	Allocation of GLN started
2001	9-digit GS1 Company Prefix introduced.
2002	EAN International’s Asia Pacific Regional Meeting held in Tokyo.
2003	GEPIR operation started.
	EPCglobal subscription started.
	Japanese Industry Standard for GS1 Application Identifier established.
2004	RFID tags for ladies’ shoes used at Mitsukoshi Department Store.
2005	Guidelines for Barcoding Pharmaceuticals with GS1 standard published.
	Promotion of GTIN started
2006	GTIN adopted for online sales of music products.
	EPCglobal Board of Governors Meeting held in Tokyo.
2007	Ryutsu BMS (Japanese XML-EDI Message Standards) published.
	GS1 Mobile Conference held in Tokyo
	GS1 DataBar Study Group launched.
2008	GS1 Healthcare conference held in Tokyo.
	Internet shopping company utilizes JICFS/IFDB.
2009	Supply Chain Standard Management & Promotion Council established.
	GS1 Healthcare Japan established.
2010	Pilot for utilization of GS1 Data Bar in supermarkets
	Mobile Day Seminar held in Tokyo
2011	Mobile Dayevent held in Tokyo
2012	GS1 Advisory Council Meeting held in Tokyo
2013	GS1 Japan celebrates GS1 40th anniversary
	GS1 B2C mobile and omni channel Seminar held in Tokyo
2014	GS1 Healthcare Japan UDI and medicinal drug traceability Seminar held in Tokyo
2015	GS1 Japan Partners was established

10. Reference

10.1 Japanese distribution systems and their characteristics

In general, Japanese distribution systems have been said to have long and complicated distribution channels, yielding low productivity. The post-war distribution research has pointed out the characteristics of traditional Japanese distribution systems of being small scale, petty, excessive, low productivity, bread-and-butter (family business), and pre-modern for retail stores. It is also known that the process from production to retail involves multiple layers of wholesalers.

Recent trends

Japanese distribution systems have greatly changed in the past 30 years. The reason involves 2 aspects, including changes in distribution-related situations and changes in distribution systems themselves.
Some examples of changes in distribution-related situations are as follows. Firstly, there are changes in the industrial structure. Some of these changes are the hollowing out of the domestic manufacturing industry caused by the overseas deployment of the secondary industry in pursuit of low-wage labor, increased imported products caused by the yen appreciation, and fatigue in domestic competitive production sites caused by the increased imported products – especially fatigue in regional industries, etc. Secondly, there are changes in the population trends. The changes in the population structure and reduced population caused by the progressing aging society with a lowering birthrate are advancing at an overwhelming rate, which has never been experienced by any other country. Along with this, consumption trends are also changing.
Next, changes in the distribution itself include the following. Firstly, there are growth in large-scale businesses and switching of major business forms. Family business-like businesses, mainly including small-scale petty businesses, have drastically reduced, and large-scale businesses have been growing. While department stores and GMS used to be the main large-scale businesses, they were replaced by chain retail stores with more distinct target, such as drugstores, electronics volume retail stores, fast fashion, etc. Many of these business forms have expanded their sales with the strong impact of low prices. Furthermore, internet shopping (online sales) has been growing its sales in recent years. The survey by the Research institute of Industry and Regional Economy indicates that the services characteristic to e-commerce were well received by consumers. The reasons to choose online shopping included “cheap prices”, “easy selection of products”, “reduced shipment time”, and “being able to order from smartphones and tablets”, etc.
The second point is the fact that the center of businesses is shifting from city centers to suburbs. In 2000, the so called the “three acts” on city planning, including “Large-Scale Retail Stores Location Law”, and “Central City Invigoration Law”, were established. With these laws, store opening was liberalized in principle, accelerating the trend to open large-scale retail stores in suburbs, where there are fewer restrictions. On the other hand, businesses have deteriorated in city centers. The administration, which has been threatened by the hollowing out, has revised part of the laws and is currently making efforts to rejuvenate city centers, but the deterioration has not been slowed down in reality. In addition, the current Cabinet is highly interested in the issue of extinguishment of local cities caused by reduced population and demonstrates the stance to proactively work on the city center issue, which is one of the factors.

Recent trends in statistics

Let’s take a look at wholesalers and retail stores in Japan (10-1.Summary of the Commerce Statistics). When we look at the shift from 2007 (Census of Commerce) to 2012 (Economic Census for Business Activity), the number of stores has increased by 11.0% for wholesalers and decreased by 9.2% for retail stores, which is a 4.6% overall decrease. The number of employees has increased by 8.4% for wholesalers and decreased by 2.3% for retail stores, which is a 1.1% overall increase. The annual product sales amount has decreased by 11.6% for wholesalers and decreased by 14.7% for retail stores, which is a 12.4% overall decrease.
Next, let’s take a look at the results by the number of employees (10-2.Number of Japanese Retailers and Wholesalers by the number of Employees). With wholesalers, slightly less than 30% are wholesalers with 2 or less employees, resulting in almost 50% if combined with the wholesalers with 3-4 employees. However, the number of employees has been decreasing between 2007 and 2012, excluding those with 300-499 employees and those with 500 or more employees. This shows that business integration of major wholesalers has been advancing, while the decrease of small-scale wholesalers, which used to exist as regional wholesalers like secondary/tertiary wholesalers, continues.
With retail stores, the number of employees is reducing with the exception of those with 100 or more employees. The cause of this includes effects from the competition with major retail businesses and closing of

small-scale petty stores caused by aging business owners and difficulty in securing successors, etc. That being said, the ratio of small-scale petty businesses is still high, and 44.8% of retail stores have 1-2 employees, and over 60% of the overall employees are hired by small-scale petty businesses, including those working in businesses with 3-4 employees. This shows that they continue to be important businesses that create employment.
When we take a look at the situation of retail stores by the business classifications (10-3.Number and sales of Retail Stores by Type of Businesses), the number of stores and annual product sales amount are both decreasing in most business types/business forms. As the fact that almost 20% of the overall retail store sales have decreased shows, this is greatly affected by the fact that Japan's market scale has been shrinking.

Market share in major business forms

The following figures describe the share (FY2013 sales) of the top 5 companies for major business forms of retail stores (Source: "Nikkei Sangyo Shimbun" P10 – 13 dated July 28, 2014).

1) The share of supermarkets is approximately 30%. The order is ÆON RETAIL: 11.5%, Ito-Yokado: 7.0%, Daiei: 4.4%, UNY : 4.1%, and LIFE CORPORATION: 2.9%.
2) Approximately 90% is covered with convenience stores. Integration of chains has been advancing. The order is Seven-Eleven: 38.5%, Lawson: 19.8%, FamilyMart: 17.5%, Circle K Sunkus: 9.1%, and Ministop: 3.5%.
3) Approximately 35% with drugstores. Matsumoto Kiyoshi Holdings: 8.2%, SUNDRUG: 7.5%, TSURUHA HOLDINGS: 6.5%, COSMOS: 6.2%, and Sugi Holdings: 6.1%.

Fig. 10.1-1 The share of supermarkets

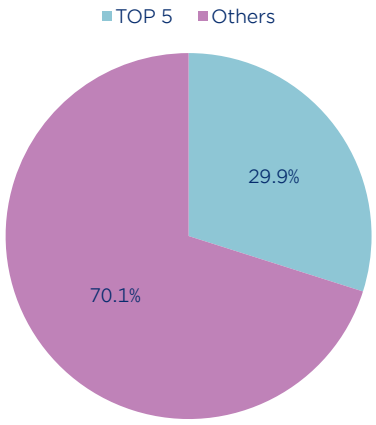


Fig. 10.1-2 The share of convenience stores

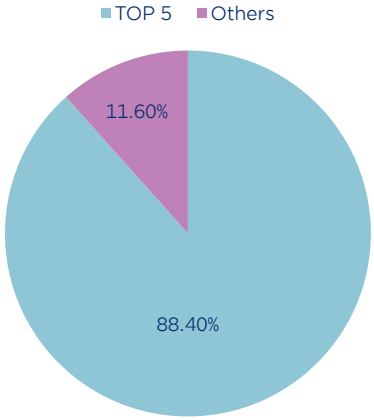
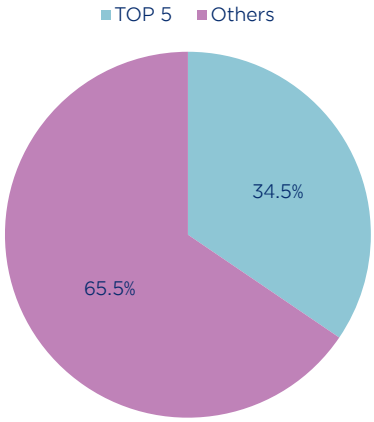


Fig. 10.1-3 The share of drugstores



10.2 Statics on Japanese Retail Industry

Table 10.2-1 Number of stores, number of employees, and annual sales by type of stores (As of 2012)

Type of Stores	Number of Stores	Composition Ratio (%)	Number of Employees	Composition Ratio (%)	Sales \Million	Composition Ratio (%)
Total number of retail stores	1,033,358					
Total (Scope of calculation by type of stores)	782,862	100	6,055,186	100	110,489,862	100
Department Stores	228	0.0	228,054	3.8	5,487,978	5.0
General Supermarkets	1,122	0.1	237,212	3.9	5,322,537	4.8
Specialty supermarket (Apparel)	7,855	1.0	111,461	1.8	2,078,965	1.9
Specialty supermarket (Grocery)	16,290	2.1	913,882	15.1	16,828,614	15.2
Specialty supermarket (Home furnishing)	10,907	1.4	267,248	4.4	5,181,093	4.7
Convenience Stores	30,598	3.9	486,834	8.0	5,490,078	5.0
Drugstore	14,872	1.9	181,214	3.0	3,803,587	3.4
Other supermarkets	52,409	6.7	371,055	6.1	4,407,643	4.0
Specialty stores (Apparel)	93,594	12.0	359,063	5.9	4,816,909	4.4
Specialty stores (Grocery)	159,807	20.4	642,388	10.6	5,960,474	5.4
Specialty stores (Home furnishing)	369,655	47.2	1,983,435	32.8	40,054,586	36.3
Large specialty store(Electronics)	2,237	0.3	82,838	1.4	5,350,099	4.8
Other retail stores	1,214	0.2	5,364	0.1	77,705	0.1
Non-store retail	22,074	2.8	185,138	3.1	5,629,594	5.1

(*1) "Employees" refer to "workers/temporary employees that are loaned/dispatched to other locations" taken out of "temporary employees" and "workers that are loaned/dispatched from other locations" added to "workers". "Workers" are the total of "private business owners", "unpaid family workers", "paid officers", and "full-time employees" and do not include temporary employees.
(*2) Annual sales per employee was calculated based on 8 hours of work by employees such as part-time employees, etc.

Table 10.2-2 Top 20 wholesale companies in Japan (As of 2013)

2013	2012	Company Name	Location of Head Office	Annual sales (¥Million)	Annual Growth(%)	Business Line
1	1	Mediceo Paltac Holdings	Tokyo	2,947,798	4.9	Drugs
2	2	Alfresa Holdings	Tokyo	2,504,504	4.9	Drugs
3	3	Mitsubishi Shokuhin	Tokyo	2,388,226	3.0	Grocery
4	4	Suzuken	Aichi	1,988,216	4.9	Drugs
5	5	Nippon Access	Tokyo	1,714,038	5.7	Grocery
6	6	Kokubu	Tokyo	1,566,762	4.3	Grocery
7	7	Toho Holdings	Tokyo	1,189,627	4.3	Drugs
8	8	Kato Sangyo	Hyogo	733,181	1.8	Grocery
9	—	Mitsui Foods	Tokyo	707,409	—	Grocery
10	9	Nihon Shuppan Hanbai	Tokyo	681,917	-3.2	Books/Audio/Video/Music Instruments
11	10	Arata	Chiba	651,954	5.8	Sundry Goods/Medical Supplies
12	11	Itochu Shokuhin	Osaka	630,464	2.6	Grocery
13	12	Vital KSK Holdings	Tokyo	564,655	3.1	Drugs
14	13	Tohan	Tokyo	508,502	1.0	Books/Audio/Video/Music Instruments
15	14	Nihon Shurui Hanbai	Tokyo	506,001	1.2	Grocery
16	15	Forest Holdings	Oita	428,268	3.4	Drugs
17	16	Asahi Shokuhin	Kochi	387,375	2.2	Grocery
18	18	YAMAE HISANO	Fukuoka	345,935	10.3	Grocery
19	19	ASICS	Hyogo	329,464	26.6	Sporting goods
20	17	World	Hyogo	317,337	-5.7	Textile

The source : The Nikkei Marketing Journal

Table 10.2-3 Top 20 retail companies in Japan (As of 2013)

2013	2012	Company Name	Type of business	Location of Head office	Annual sales (¥Million)	Growth (%)
1	1	Aeon	Holding Co.	Chiba	6,395,142	12.5
2	2	Seven & I Holdings	Holding Co.	Tokyo	5,631,820	12.8
—	—	Aeon Retail	Supermarket	Chiba	2,140,100	—
3	3	Yamada Denki	Specialty store	Gunma	1,893,971	11.3
4	4	Isetan Mitsukoshi Holdings	Holding Co.	Tokyo	1,321,512	6.9
—	—	Ito-Yokado	Supermarket	Tokyo	1,311,988	-1.5
5	5	J. Front Retailing	Holding Co.	Tokyo	1,146,319	4.9
6	6	Fast Retailing	Holding Co.	Yamaguchi	1,143,003	23.1
7	—	UNY Group Holdings	Holding Co.	Aichi	1,032,125	—
8	7	Takashimaya	Department store	Osaka	904,179	3.9
—	—	Daiei	Supermarket	Tokyo	813,645	-2.1
9	16	Bic Camera	Specialty store	Tokyo	805,378	55.5
—	—	Sogo・Seibu	Department store	Tokyo	801,535	-1.2
—	—	UNY	Supermarket	Aichi	771,487	0.3
10	8	edion	Specialty store	Osaka	766,699	11.9
11	11	Amazon Japan*	Online retailer	Tokyo	740,000	19.4
12	9	K's Holdings	Specialty store	Ibaraki	701,198	10.0
13	10	Yodobashil-Camera	Specialty store	Tokyo	690,814	8.4
—	—	UNICLO	Specialty store	Yamaguchi	683,314	10.2
—	—	7-11 Japan	Convenience Store	Tokyo	679,560	10.0
—	—	Daimaru Matsuzakaya Department Stores	Department store	Tokyo	678,286	2.7
—	—	Mitsukoshi Isetan	Department store	Tokyo	675,315	7.5
14	14	H2O Retailing	Holding Co.	Osaka	576,852	9.8
15	12	Don Quijote Holdings	Specialty store	Tokyo	568,377	5.2
16	13	Izumi	Supermarket	Hiroshima	556,852	4.0
17	15	Life Corporation	Supermarket	Osaka	534,923	2.9
18	17	SHIMAMURA	Specialty store	Saitama	502,901	2.2
19	19	Matsumotokiyoshi Holdings	Specialty store	Chiba	495,385	8.6
20	18	Lawson	Convenience Store	Tokyo	485,247	-0.5

An asterisk (*) indicates a consolidated subsidiary whose parent company is included in the top 500 list.

The source : The Nikkei Marketing Journal

Table 10.2-4 Top 10 convenience store chains in Japan (As of 2013)

2013	2012	Company Name	Location of Head Office	Group	Annual sales (¥Million)	No. of stores
1	1	Seven-Eleven Japan	Tokyo	Seven & I Holdings	3,781,267	16,319
2	2	Lawson	Tokyo	Mitsubishi Corporation	1,945,394	11,606
3	3	Family Mart	Tokyo	Itochu Group	1,862,728	10,547
4	4	Circle K Sankus	Tokyo	UNY Group Holdings	1,018,891	6,359
5	5	Ministop	Chiba	Aeon	349,914	2,186
6	6	Daily Yamazaki	Tokyo	Independent	209,985	1,586
7	7	Seicomart	Hokkaido	Independent	181,686	1,164
8	8	JR East Retail Net	Tokyo	East Japan Railway Company	99,877	508
9	9	Three F	Kanagawa	Independent	88,476	563
10	10	Poplar	Hiroshima	Independent	83,210	655

The source : The Nikkei Marketing Journal

Table 10.2-5 Sales by type of merchandise in department stores
(As of 2014)

Type of Merchandise	Total sales (¥Million)	%
Total sales	6,212,458	100.0%
Apparel	2,095,220	33.7%
Accessories	808,299	13.0%
Household goods	297,544	4.8%
Grocery	1,715,422	27.6%
Restaurant	173,888	2.8%
Sundry goods	933,510	15.0%
Service	68,458	1.1%
Others	120,116	1.9%
(Shopping gift cards) *	-185,434	—

(*The sales of shopping gift cards are not included in the total sales.)
The source : Japan Department Stores Association

Table 10.2-6 Sales by type of merchandise in chain stores
(As of 2014)

Type of Merchandise	Total sales (¥Million)	%
Total sales	1,302,075	100.0%
Grocery	822,651	63.2%
Apparel	122,141	9.4%
Sundry goods	110,776	8.5%
Drugs & Cosmetics	42,572	3.3%
Furniture & Homefurnishing	56,788	4.4%
Home electrical apparatus	14,068	1.1%
Other living goods	48,087	3.7%
Service	4,114	0.3%
Others	80,878	6.2%

The source : Japan Chain Stores Association
(60 member companies and 9,372stores)

Table 10.2-7 The growth of e-commerce market in Japan (As of 2014)

Type of Merchandise		2011		2012		2013		
		Scale (¥Billion)	EC ratio	Scale (¥Billion)	EC ratio	Scale (¥Billion)	y/y	EC ratio
Retail	GMS	1,782	4.74%	1,891	5.05%	2,200	116.4%	6.39%
	Apparel & Accessories	144	1.12%	175	1.33%	220	125.8%	1.65%
	Grocery	532	0.85%	605	0.96%	706	116.7%	1.08%
	Automobile, Automobile Parts	1,246	4.08%	1,426	4.29%	1,648	115.6%	4.84%
	Furniture, Household goods							
	Electrical products							
	Drugs & Cosmetics	420	3.64%	501	4.02%	603	120.4%	4.56%
	Sporting goods, Books, Music, Toys	367	2.46%	400	2.74%	467	116.6%	3.26%
Service	Tourism	1,270	5.47%	1,496	6.16%	1,826	122.1%	7.38%
	Restaurants							
	Entertainment	131	0.89%	147	0.94%	166	112.9%	1.19%
Construction		N/A	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturing		119	N/A	116	N/A	115	99.3%	N/A
ICT		2,032	N/A	2,295	N/A	2,697	117.5%	N/A
Transport & Logistics		264	N/A	307	N/A	363	118.0%	N/A
Financial Services		72	N/A	68	N/A	69	100.7%	N/A
Wholesalers		80	N/A	86	N/A	86	100.1%	N/A
Other								
Total		8,459	N/A	9,513	N/A	11,166	117.4%	N/A
Total (Retail and Service)		5,892	2.83%	6,641	3.11%	7,836	118.0%	3.67%

The source : METI (Ministry of Economy, Trade and Industry) "FY 2013 Research on Infrastructure Development in Japan's Information-based Economy Society (E-Commerce Market Survey)"
The EC ratio in this survey refers to the ratio of the e-commerce market scale against the total amount of the overall commercial transactions.

Table 10.2-8 Top 20 e-commerce (B2C) players in Japan (As of 2013)

	Company Name (Website)	Annual sales (¥Million)	Annual Growth (%)	EC ratio	Line of goods	Account Closing Month
1	Amazon Japan (amazon.co.jp)	620,000	18.6	100%	General	Dec
2	Senshukai (bellemaison.jp)	81,380	12.0	62%	General	Dec
3	Nissen (nissen.co.jp)	67,200	-2.9	39%	General	Dec
4	Joshin Denki (joshinweb.jp)*	57,000	-	100%	Home electrical apparatus	Mar
5	Dell (dell.co.jp)*	52,000	-	100%	PC	Jan
6	Yodobashi-Camera(yodobashi.com)	45,800	33.6	100%	Home electrical apparatus	Mar
7	Ito-Yokado (www.itoyokado.co.jp)	40,000	14.3	100%	Grocery	Feb
8	Japanet Takata (japanet.co.jp)*	35,200	-23.4	30%	Home electrical apparatus	Dec
9	Start Today (zozo.jp)	35,050	10.2	100%	Apparel	Mar
10	Dinos Cecile (dinos.co.jp)	31,429	4.8	55%	General	Mar
11	QVC Japan (qvc.jp)*	29,910	11.0	30%	General	Dec
12	Sony Marketing (sony.jp)*	27,000	-	100%	PC	Mar
13	Seven & i Net Media (www.7netshopping.jp)*	26,760	17.2	100%	General	Feb
14	AbelNet (www.pc-bomber.co.jp)	26,695	5.7	100%	Home electrical apparatus	Feb
15	Jupiter Shop Channel (shopch.jp)*	26,000	8.3	20%	General	Mar
16	DHC (www.dhc.co.jp)*	25,900	-	52%	Cosmetics/Health Foods	Jul
17	Felissimo (felissimo.co.jp)*	25,000	-	58%	Apparel/Accessories	Feb
18	MOA (a-price.co.jp)	24,600	-8.2	100%	Home electrical apparatus	Jun
19	Bic Camera (biccamera.com)	24,000	20.0	96%	Home electrical apparatus	Aug
20	Dinos Cecile (www.cecile.co.jp)*	23,800	-	44%	General	Mar

The source : Koubunshuppan

(*:estimate)

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