GS1 Japan

GS1 Japan Handbook 2014-2015

Message from the President

GS1 Japan joined GS1 (then EAN International) in 1978, and we have grown together ever since. In FY 2013, a record number of over 9,000 companies were allocated a GS1 Company Prefix, and the total number of member companies in Japan has now exceeded 130,000. The number of companies using the GS1 standard is steadily increasing, and we are grateful for the collaboration and contribution of the GS1 community.

While the Japanese economy appears to be overcoming deflation and heading for recovery, many issues still remain. In particular, the needs to promote digitization, handle increasing amounts of information and ensure safety and security in various industry sectors is affecting Japanese industry and posing a high challenge to the value chain. This is making adoption of the GS1 System increasingly necessary.

The development and spread of digitization is also having a major impact on the value chain. For example, online sales are growing rapidly. In fact, among the new GS1 Company Prefix licensees last year, over 10% indicated that they needed GTIN for the products they sell online. More retailers with conventional with brick-and-mortar stores are now engaged in Omni-Channel Retailing, which involves seamless integration of in-store and online sales. These changes will impact the GS1 System and its use, and GS1 Japan will actively undertake further initiatives to promote digital commerce.

The increased amount of information is having an impact on consumer behavior in particular. Compared to a decade ago, consumers gather a lot more information, and are making their purchasing decisions based on it. At the same time, there is increasing demand for more accurate information. Companies have been under pressure to respond to these changes and needs. GS1 Japan must also investigate the best options for database services and effective information exchange.

Consumers are greatly concerned about product safety and security, and many companies are working on this. Currently, they are still mainly in the stage of establishing and managing in-house product safety and traceability. Some companies, however, are already expanding these efforts throughout their supply chains. GS1 Japan is working to promote implementation of GS1 System to help these efforts.

GS1 Japan will continue to respond to technical innovation, the evolution of company needs, and changes in consumer behavior. We intend to strengthen our efforts to promote adoption and widespread use of the GS1 System. We hope that member companies, GS1 MOs, and the GS1 Global Office will continue to achieve development, and we look forward to providing greater consumer satisfaction through GS1 standards.

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 130,303 companies as of March 2014 (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.

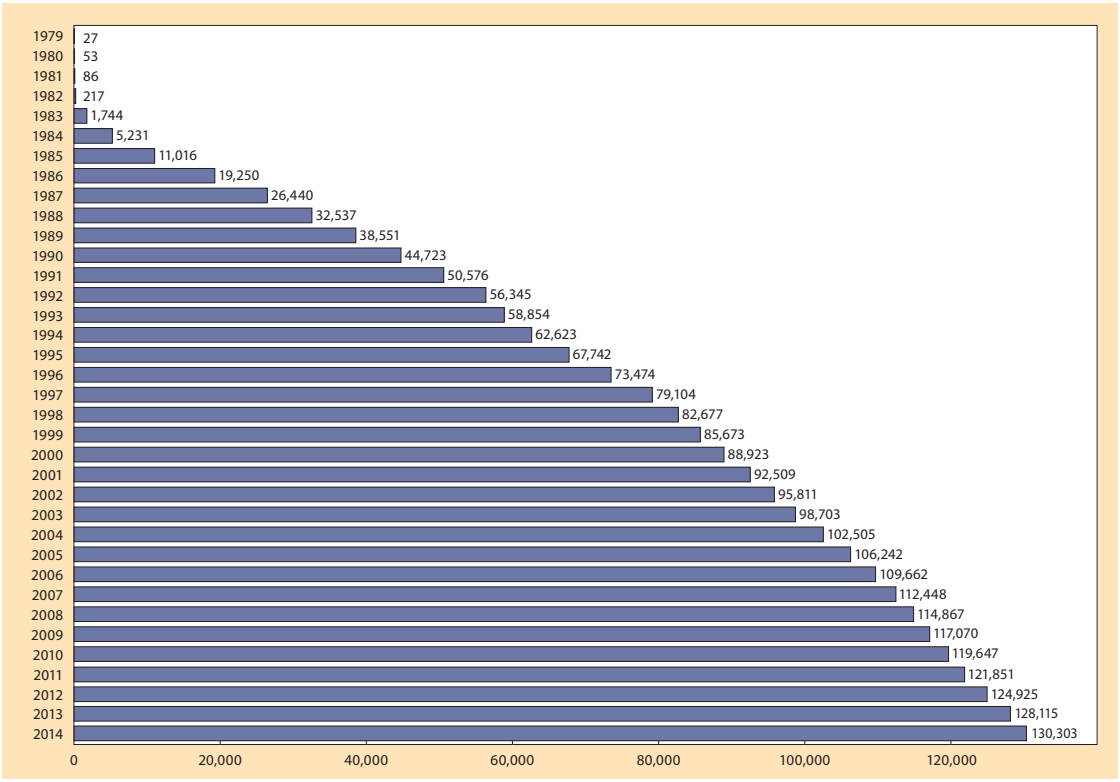
Along with the expansion of online shopping, the number of GS1 Company Prefix allocation will continue to increase.

1.2Global 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

Fig. 1.1-1 GS1 Company Prefix allocation



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.

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 uses 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 Use of GTIN by Amazon. co. jp

An increasing number of online retailers are using GTIN. The following explains some examples and the potential for further promoting GTIN.

GTIN used in the "Amazon Advantage Program"
In Japan, the Advantage Program started in June 2006 for books, videos, DVDs, music CDs, software and videogames. The Advantage Program is also available in the United States, the United Kingdom, France, and Germany.
As an Advantage Program user, GS1 Japan has been selling some of its GS1 standard publications since 2007. Amazon. co. jp® uses GTIN in its "Advantage Program". The Advantage Program is available to small businesses including sole-proprietorships. The program can be used by small publishers and businesses who find it difficult to sell their books, CDs, or music through conventional brick-and-mortar stores.
To participate in the program a vendor needs the following:
★Sales rights for any items to be sold
★A valid ISBN or GTIN for each item
★A barcode on each item mapped to the valid ISBN or GTIN
★Access to email and the Internet ☆A legal address in Japan
☆A bank account in Japan
☆Be at least twenty years old and residing in Japan or a business located in Japan
(★Requirements common to all countries, ☆Registrants to Japan only)

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.

Amazon allocates its own Amazon Standard Item Number (ASIN), in addition to an ISBN or GTIN, and uses these numbers for merchandise management.
ASIN is used because the same product is sometimes sold by different vendors. This allows items with different ISBN or GTIN to be managed as the same product on the Amazon website.
ASIN is mapped to ISBN and GTIN in the Amazon. co. jp® product master data, and GTIN is used for product inspections at the fulfilment center or other distribution sites. It is therefore a prerequisite in "Amazon Advantage Program" to have ISBN or GTIN barcodes source-marked on all items.

Increasing registration of GS1 Company Prefix

For the reasons described above, an increasing number of businesses using the "Amazon Advantage Program" are applying to GS1 Japan to register their company prefixes. In the period from FY 2006 to March 2012 many new registrants of the GS1 Company Prefix always cited Amazon as their main partner. The Amazon site posts information on GS1 Japan as the contact for GTIN application. GS1 Japan continues to have close contact with Amazon.co.jp as required.
Merchandise sold on Internet shopping sites fall into two groups: (1) items sold both online and at brick and- mortar stores and (2) items sold only online. GTIN previously had no role to play in online-only sales, but Amazon's example is significant from the perspective of expanding GTIN's potential.
GS1 Japan is a user of "Advantage Program."
Some GS1 Japan publications are sold at Amazon. co. jp®

Fig. 1.3.2-1 GS1 Japan publications available at Amazon. co. jp®

Search function using GTIN and cell phones

Amazon introduced a service called "Amazon Scan Search" in 2004. This service enables users to scan GTIN or ISBN barcodes from product packages using their cell phones, which in turn enables them to directly access the Amazon.co.jp page for the respective product. When customers are interested in a product, they can search for information on it right from their cell phone and place an order right away. Mobile phones with cameras are very popular in Japan, consumers will find it easier to shop on the Internet using this service. This is expected to promote the further spread of GTIN in the area of mobile commerce.

Fig. 1.3.2-2 Scanning GTIN or ISBN using cell phones with camera

1.3.3 Using GTIN in online sales – Rakuten Ichiba Case Study

Rakuten Ichiba is one of Japan's largest ecommerce platform 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 reg-

istered 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 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.

Fig. 1.3.3-1 Rakuten Ichiba MOBILE (sample screen)

Rakuten Inc. is expanding its e-commerce and e-book services into 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.

1.3.4 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. 1.3.4-1 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

Fig. 1.3.4-2 Result for scanning GTIN

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.

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.

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

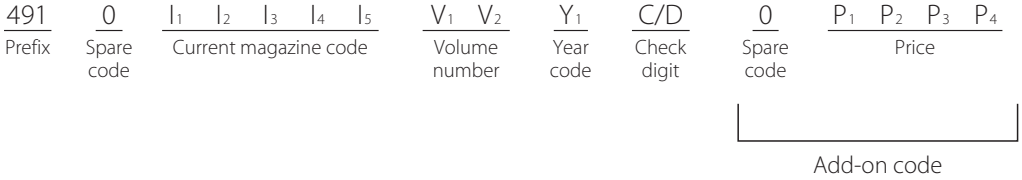


Fig. 1.4.1-2 Code structure for books

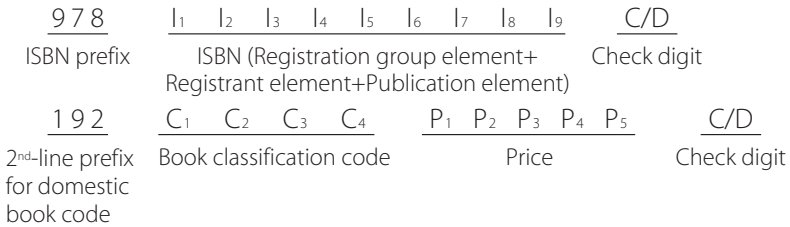
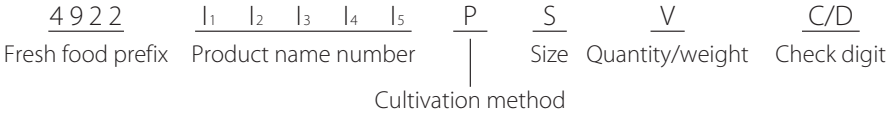


Fig. 1.4.2-1 Fresh food identification code structure



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. 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 GLNs 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 e-marketplaces of from department stores to wholesaler and in the EDI between the Japanese Consumers' Co-operative Union and its suppliers. We have additionally recommended the use of GLN to companies adopting the Ryutsu BMS, the Japanese EDI standard. (See 2)

In Japan, GLN has been used mainly as a basic GLN, which identifies a company. With involvement of users and solution providers who develops 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 symbolsare only capable of carrying a GTIN, the abovementioned symbols can hold a variety of detailed 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

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

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 share use cases. We also support users who want to introduce Application Identifiers to better exchange information. For 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 (see 5.4) is an example of standardization of data elements and data carriers to accommodate the local needs using Application Identitiers.

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 sell-by 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 in-store, 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 indus-

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

try exhibitions and seminars by related business associations to promote the use of additional data and GS1 DataBar.

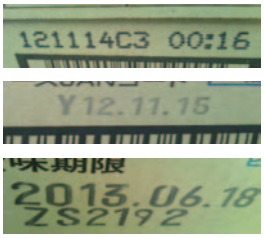
1.8 Technical Research: Direct Printing of GS1 Data Carriers with Attribute Information on Cardboard Boxes

1.8.1 Background of the research

In 2012, GS1 Japan initiated a study to look into the current level of inkjet technology 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. In the healthcare sector, the GS1-128 barcode printed on a label is already used on individual cardboard boxes. On the other hand, many CPG businesses argue that printing barcodes on labels is too costly. This is because, compared with regulated healthcare trade items, the unit prices of CPG merchandise are too low to allow for the expense required for printing. For these reasons, to evaluate the present situation of inkjet direct printing of barcodes on cardboard boxes, we printed codes under various conditions and reviewed the results.

Fig. 1.8.1-1 Date and other information in text on corrugated boxes (examples)



1.8.2 Direct printing and barcode quality

Thanks to the cooperation of printer manufacturers, we used five (5) models of commercially available high-resolution ink-jet 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.

The biggest challenge for ink-jet 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.

For the white solid, which was expected to be a measure of contrast improvement, we reaffirmed that there was a challenge of compatibility between the white flexographic ink and the barcode printing ink. To obtain more stable quality, it is essential to carefully consider the compatibility between the white ink and the barcode printing ink.

In our comparison of the two transfer speeds, 30 m/min and 40 m/min, we confirmed that the faster speed slightly increased the maximum reflectance, that is to say, the black bar became thinner. Other than that, we did not see any major differences. With regard to the content of the barcode printing (type of barcode, data content, and minimum width of the bar), there was no characteristic that deserved special mention.

For reference, we performed a reading test on the printed symbols under limited conditions. In this test, the printed sample moved on the transfer line at a speed of 40 m/min and 60 m/min, and the sample was read using statio nary-type barcode readers (two laser system models and two camera system models). We found that the accuracy of the reading was fairly high, even with the Grade D barcode samples. Considering that ITF symbols and even EAN-13symbols printed on ordinary liners are actually employed in spite of their Grade D status, we might expect that a Grade D would be sufficient for practical use if we can suitably set up and adjust the transfer line and reader because the conditions were not satisfactorily optimized in this test.

1.8.3 Ongoing technology verification IJP marking

Based on the results of the previous fiscal 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 wide-

ly 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 symbols 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, 90% of tested samples recorded 100% read-rate. 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 more options for marking packages.

1.8.4 Investigation with a view to onsite operation

This kind of technical information obtained from our investigations will be shared with users such as brand owners, wholesalers and retailers. We plan to continue the study looking at actual operation issues. This includes questions such as when displaying a barcode with attribute information on a product cardboard box, where it should be positioned, impact of x-dimension and data length to the size of attribute symbols.

1.9 Promoting GS1 QR Code

1.9.1 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 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

Fig. 1.8.4-1 Symbol quality of direct inkjet printed barcodes

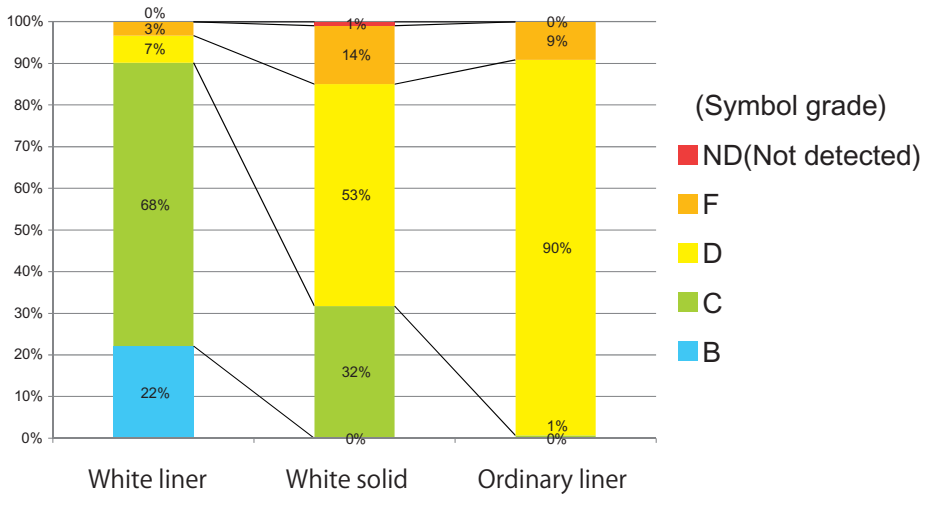


Fig. 1.9.1-1 QR code on foods

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.

Fig. 1.9.1-2 Example of QR code

1.9.2 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. 1.9.2-1 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.

1.9.3 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.

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. And in the 2000s, based on Efficient Consumer Response (ECR) and Quick Response (QR) procedures, Ryutsu (*2) Business Message Standards (known as Ryutsu BMS) was established for the purpose of achieving of information sharing among companies

2.1.1 From the JCA Protocol to the Ryutsu BMS

The JCA Protocol drawn up in 1980 became widespread as an EOS for retail businesses. It was designated in 1982 by the Ministry of International Trade and Industry (present Ministry of Economy, Trade and Industry (METI) as the standard communication protocol for the retail industry (J Protocol). After that, the J Protocol was also adopted by retail businesses other than supermarkets as a main tool for EDI. The business procedures covered by EDI expanded from the EOS to shipping and receiving of goods, invoicing and payment. On the other hand, with the spread of the Internet in 2000 and later, the following issues connected with the J Protocol began surfacing:

- 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 in June 2005 started investigating a next-generation EDI. Their examinations were performed as part of the project for promoting the optimization of the entire supply chain conducted by METI from FY2003 to FY2005. METI continued the Supply Chain Information System Standardization Project for three years from FY2006 to FY2008 to support standardization measures for supermarket businesses. As a result, in April 2007, the Ryutsu BMS were created as a new EDI standard. The Ryutsu BMS is now being increasingly adopted throughout the Japanese retail industry.

2.1.2 Outline of the Ryutsu BMS

The Ryutsu BMS defines the followings:

Communication infrastructure

Now that the Internet is widely used, the Ryutsu BMS designates the following three standard communication protocols:

- Two server-to-server protocols: ebMS and AS2
- One 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.

Standard Messages

The standard messages are classified into three types and managed for each type of business process model as follows:

- Basic messages

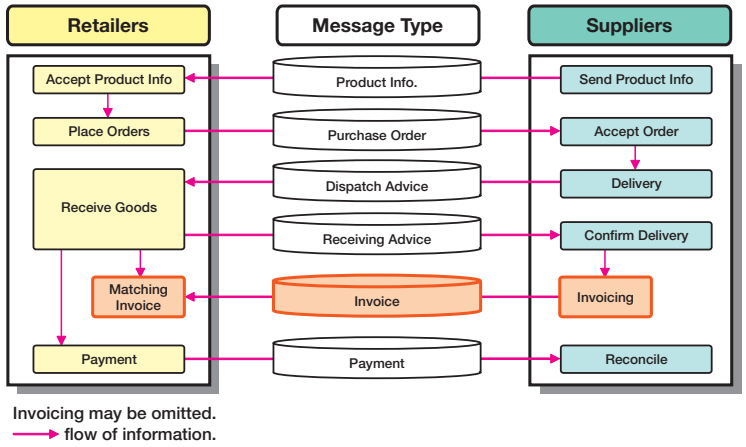
Intended for use at supermarkets, drugstores, etc. 26 basic messages were published based on the Order to Cash business model. In 2010, retailers and the apparel industry worked together to develop peer-to-peer product information data messages.

*1 JCA Protocol
This is 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
Ryutsu is Japanese equivalent of supply and demand chain, typically consists of three groups; Manufacturers, Wholesalers and Retailers.

*3 JX Protocol
This is 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.

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



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 Users' commitment to Ryutsu BMS

According to a survey conducted by GS1 Japan in, 148 retailers and 206 wholesalers or manufacturers have already adopted the Ryutsu BMS. The survey results by business category and product are described in Table 2.1.3-1.

Table 2.1.3-1 Number of companies the implementing Ryutsu BMS as of April 1, 2014

Retailers

Business Category	Adopted	Plan to adopt	Subtotal
1. Supermarket	104	11	115
2. Department Store	8	3	11
3. Drugstore	8	3	11
4. DIY Store	4	0	4
5. Cooperative Store	4	0	4
6. Warehouse Club	1	0	1
7. Voluntary Supermarket Chain	1	0	1
8. Discounter	0	1	1
Total	**130**	**18**	**148**

Wholesalers or Manufacturers

Business Category	Adopted	Plan to adopt	Subtotal
1. Food, Beverage Wholesaler	56	0	56
2. Confectionery Wholesaler	18	4	22
3. Commodities, Cosmetics Wholesaler	23	1	24
4. Drug Wholesaler	5	2	7
5. Apparel, Shoes Wholesaler or Manufacturer	23	11	34
6. Food Manufacturer	25	2	27
7. Household Goods Wholesaler or Manufacturer	9	1	10
8. Packaging Material Wholesaler or Manufacturer	11	9	20
9. Toys and Hobbies Wholesaler and Manufacturer	3	0	3
10. Consumer Electronics Wholesaler or Manufacturer	2	0	2
11. Other Wholesaler or Manufacturer	1	0	1
Total	**176**	**30**	**206**

2.2 Supply Chain Standards Management & Promotion Council

Supply Chain Standards Management & Promotion Council was founded in April 2009 by various industry groups and businesses to help promote efficient supply chain information system in Japan's retail sector.
The activities of the council include maintaining and promoting the Ryutsu BMS (see 2.1.2), which was initially developed with the support of the Ministry of Economy, Trade and Industry. At present, GS1 Japan acts as the secretariat of the council.
The Council held its inaugural General Assembly in Tokyo in April 2009. The council consists 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 April 2014, the council has 49 full member organizations and 190 supporting members. In 2014, the council is being operated with the following structure:

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. The officers of the council are also appointed at the general assembly for two-year terms.

(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. In 2014, the committee is composed of representatives from 14 full member organizations.

(3) Working Groups

The Council has three working groups as follows (See 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 the established standards. The group examines such requests, decides on the steps to be taken, revises the relevant guidelines and publishes new standards. In 2012, the group set the standard for product images (image size, resolution, filenames etc.) for online supermarket and published a guideline.
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 among SMEs. The group also monitors "off the standard usage" of Ryutsu BMS.

Activities for promotion and increasing adoption

To encourage wider use of the Ryutsu BMS, the council is engaged in the following activities:

1) Holding various seminars on the Ryutsu BMS
   The council holds introductory, implementation courses on Ryutsu BMS. The council also holds half day seminars focusing on the Ryutsu BMS case studies at several major cities across the country. (For more details, see 7.1)
2) Introducing Ryutsu BMS best practices and exhibiting at Retail Tech Show 2014
   Under the name of "Ryutsu BMS Solution Zone & Stage", the council took part in Retail Tech Show

Fig. 2.2-1 Organizational Structure of the Council (2014)

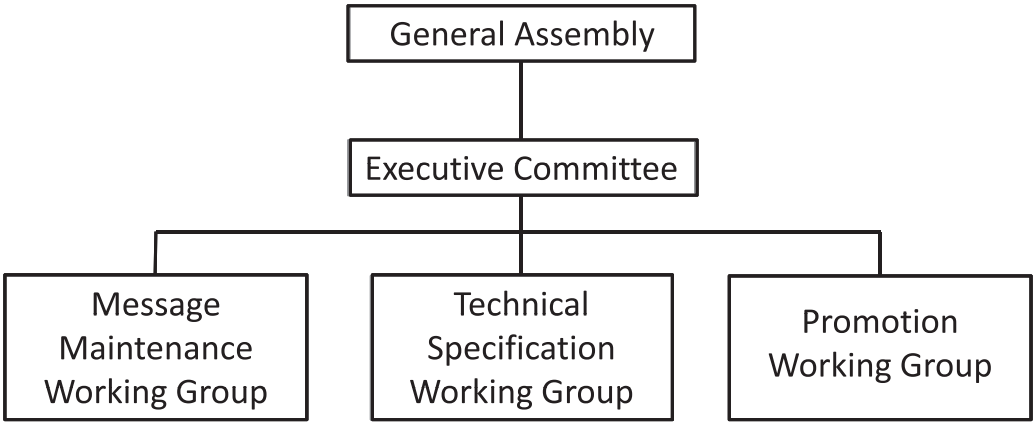


Fig. 2.2-2 Ryutsu BMS Solution Zone & Stage at Retail Tech Show 2014

2014, the biggest annual exhibition focusing on retail technology. At the event, members of the council introduced 10 best practices and exhibited Ryutsu BMS-related products developed by supporting members.

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 2014, there are 93 products accredited and permitted to use the logo.

Fig. 2.2-3 Ryutsu BMS logo

みんなつながる 流通BMS

2.3 IT Adoption by Yamanaka Supermarkets

Yamanaka Co., Ltd. has 67 supermarkets mainly in Aichi Prefecture. Taking advantage of IT from early on, the company has been pursuing efficient store operation.

Yamanaka introduced an electronic ordering system (EOS) in 1975, and then in 1983 it adopted an electronic data interchange (EDI) system based on the JCA Protocol (see 2.1.1)). Yamanaka has continued to streamline its operations from ordering to payment.

Yamanaka sees ordering as the core of a backbone system, and since 2007 carried out an automatic ordering pilot project in order to achieve the following goals.

- Reduce manual labor involved in ordering
- Quickly detect products that are selling well or poorly
- Reduce missed opportunity and product loss
- Eliminate unnecessary stock
- Increase product turnover

There is more than one way to perform automatic ordering. A simple method involves automatically determining order quantities based on cumulative sales from POS data. Other methods take a large number of factors into account, such as PI values by category (number of items purchased per 1,000 people passing through the cash register), conditions including weather, temperature, humidity index, and regional events, as well as the numbers of customers in each time period, store location, and promotional

Profile of Yamanaka
Established: 1922
Capital: JPY 42.2 billion
Sales: JPY 102.3 billion
Business areas: Supermarket chain operation, fresh flower sales, and sports club operation
Number of stores: 68
Number of employees: Approx. 4,400

ヤマナカ

campaigns. Yamanaka adopted a demand forecasting method with a combination of the above elements and past sales performance and lead times.

The results of the pilot project were good and automatic ordering was deemed an effective means for cost reduction. In 2008, the following year, the system was already expanded to all stores. In the future, the company wants to utilize automatic ordering for its planogram, and be able to change shelf display with the seasons and to respond quickly to campaigns.

In 2013, Yamanaka Switched its EDI from JCA to Ryutsu BMS. Although it had 20 JCA modems, they were starting to fail, and with the warranty period expired, the units were becoming unusable. The company realized the necessity of adopting Ryutsu BMS, which connects to the Internet and does not require a dedicated modem device.

The benefits of Ryutsu BMS introduction include reduction of customization, reduction of transmission time due to the use of the Internet, paperless operations, and operational visibility. The major benefit for Yamanaka was a huge reduction in data transmission time. This coupled with the synergy effect of automatic ordering made it possible to shorten ordering times, and further shorten ordering deadlines. It also increased the time for restocking shelves, and allowed for the flexible reallocation of personnel to other departments.

Next, Yamanaka wants to receive product master data using Ryutsu BMS messaging, Product data is important for Yamanaka as it deals with as many as 160 suppliers delivering chilled grocery such as tofu and fish cake, compared to 30 companies supplying dry goods. Also, with new sundry goods continually coming out, the release dates often overlap. This creates a lot of trouble for obtaining and inputting new product information. In order to further streamline its operations, Yamanaka expects to obtain product information through Ryutsu BMS.

3. Database Service

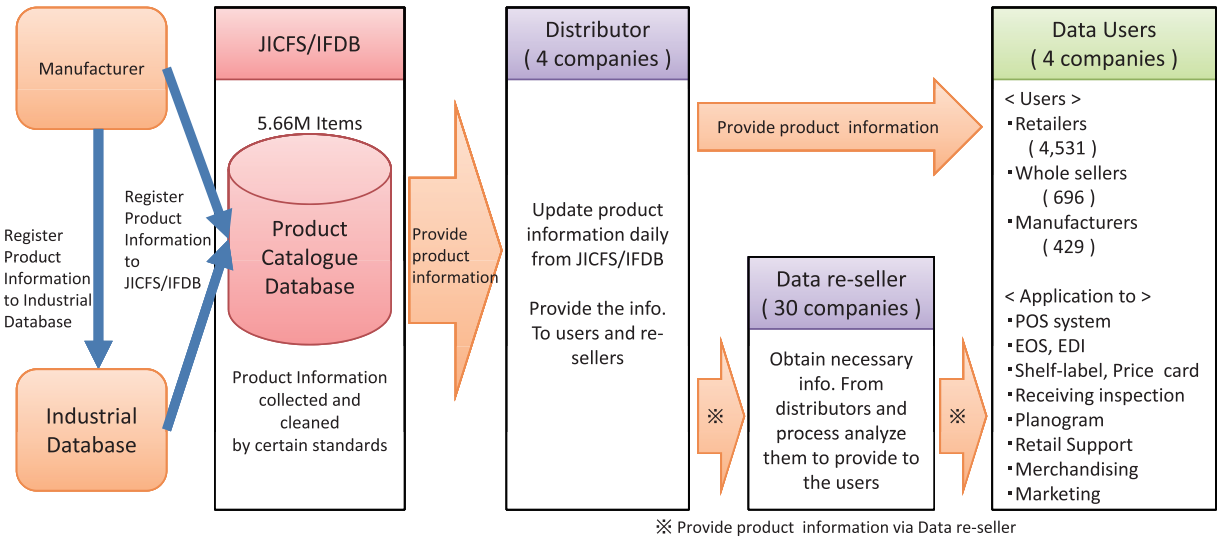
3.1 JICFS/IFDB (Japan Item Code File Service/Integrated Flexible DataBase)

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). As of March 2014, product information data registered in the JICFS/IFDB covered over 6 mil-

Fig. 3.1-1 JICFS/IFDB system flow



※ Provide product information via Data re-seller

	2010	2011	2012	2013	2014
Food	947,898	1,043,430	1,123,796	1,209,636	1,291,008
Commodity	533,279	590,008	628,054	673,700	714,237
Recreation and Miscellaneous	277,535	334,197	382,640	417,922	453,135
Durable Goods	173,835	195,070	211,385	230,718	262,309
Apparel, Personal items & Sporting goods	167,611	183,405	204,713	222,660	245,395
Other	3,608	3,494	4,585	3,315	3,262
Active item Total	2,103,766	2,349,604	2,555,173	2,757,951	2,969,346
Inactive Data	3,104,154	3,104,154	3,104,154	3,104,154	3,104,154
Grand Total	5,207,920	5,453,758	5,659,327	5,862,105	6,073,500
Increase in number of items (year-on-year)	230,496	245,838	205,569	202,778	211,395

lion products from 30,000 manufacturers. About 5,700 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.

3.1.1 Example of using JICFS/IFDB

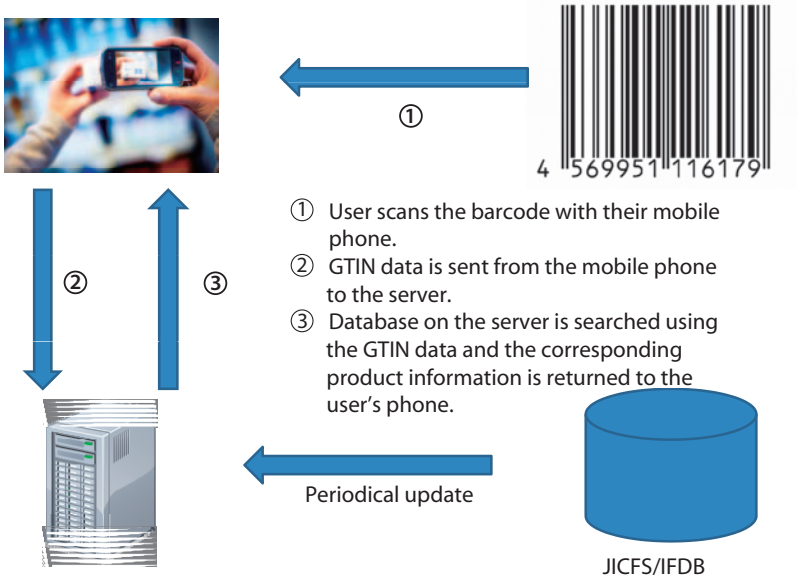
An enterprise provides a mobile content service to support the health of users. The application uses various functions including pedometer and GPS built into the mobile devices.
One feature of this service allows users to check the calorie of packaged foods. Before launching the service, the company built an original database of food product names and their calories, but it did not include GTIN.
So it was not easy for users to find products using product name as a search key from the database that contains enormous products information. Therefore the company decided to prepare a more user-friendly interface that allows users to search by scanning the barcode printed on a product. In order to do so the company mapped the database and JICFS/IFDB using product names and added GTIN to the database.
For those 20,000 items where product names did not match, the company decided to keep product names as they were so as to avoid confusion among current users who are already familiar to using product name as a search key.
The enterprise uses JICFS/IFDB to periodically update and add product information. At present, when adding or updating data in the product information database, the enterprise uses the existing JICFS/IFDB product name as is.

3.2 GEPIR

GEPIR, the company database for 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 .

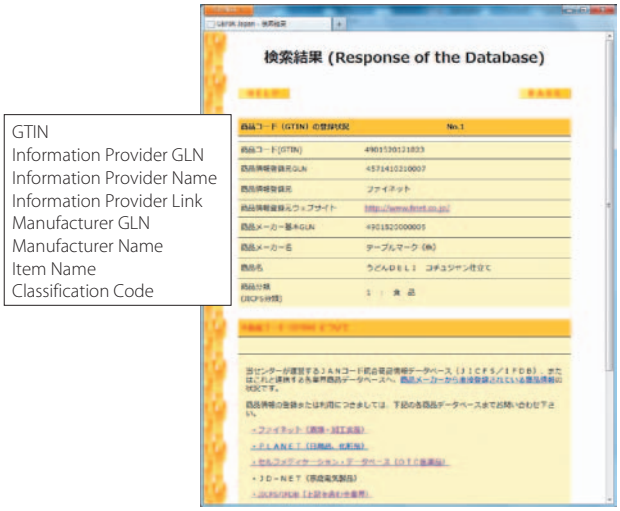
Fig. 3.1.1-1 check the calorie counts of packaged foods



- 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.

Fig. 3.2-1 Product information search results



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.

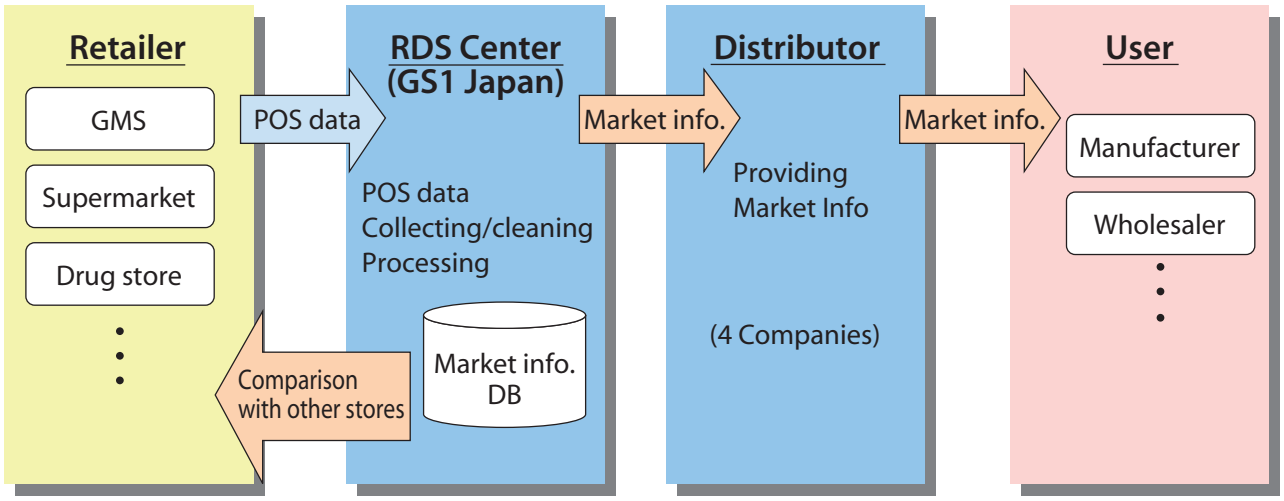
Retailers only need an PC connected the Internet to use the service, and even small-scale retailers can easily compare and analyze their own POS data with data from other retailers in the region. See 5.2.2 for detailed case examples. The word RDS stands for Ryutsu POS Database Service, and the Japanese 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-devel-

Fig. 3.3-1 RDS system



oped 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.

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 web-based 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

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

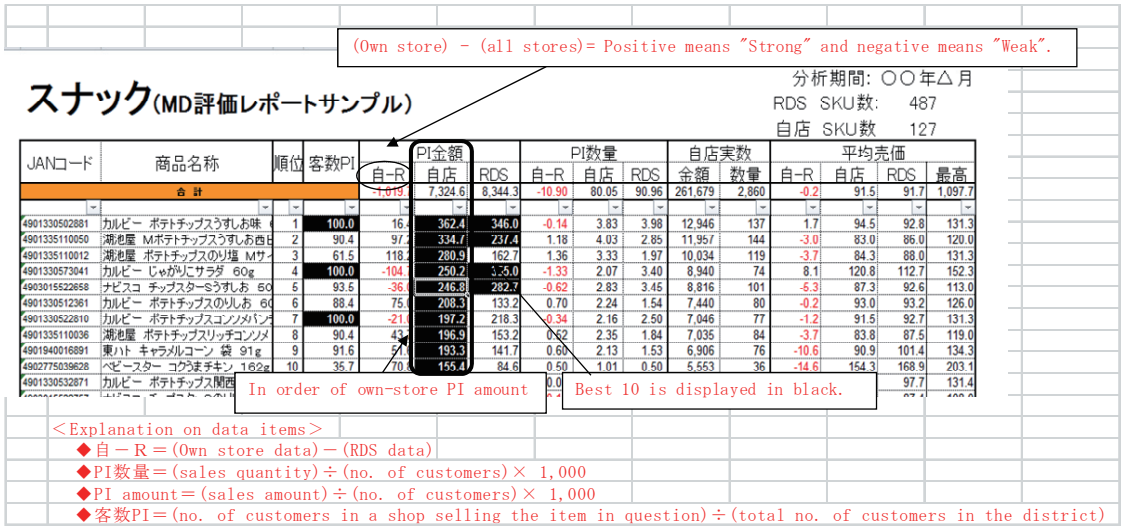


Fig. 3.3.2-2 Snack-food section of Store "A" after improvement

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 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 research on RFID. Those efforts then led to the founding in 2003 of EPCglobal, a new organization that combined RFID tags and Internet technology for the purpose of standardizing and promoting EPC/RFID systems. In this context, in 2004, EPCglobal membership was established in GS1 Japan.

4.1.1 GS1 Japan EPCglobal subscription services

In 2003, GS1 EPCglobal standards development was being actively performed. Therefore the subscription services focused on helping the members participate in the standards development activity and to provide support to include domestic needs in the global standards. Since a set of EPCglobal standard specifications were already laid down, our focus is now on promoting the implementation and use of these EPCglobal standards. Accordingly, the subscription services have shifted to the current and potential users of GS1 EPCglobal standards and Solution Providers who are helping users implement systems based on the standards. The following services are provided to subscribers:

- Provide information on the trend of standardization and overseas best practices
- Provide information about GS1 EPCglobal standards (i.e. EPCIS)
- site visit for EPC/RFID best practices
- Provide tools and support that help subscribers implement GS1 EPCglobal standards
- Facilitate interchange between subscribers and aid subscribers' standard promotion activities.

4.1.2 Recent Activities of EPC/RFID

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

- Holding regular EPC/RFID introductory courses, including providing a EPC/RFID demo system for users
- Building of EPCIS common infrastructure and demonstrating the system
- Partnership with related organizations (ISO SC31, 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 announced the Recommendation ion 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 GS1GO and the MOs of

Fig 4.1.2-1 RFID study committee

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 Showcase

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 will help 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 been developing 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.

As a FY 2013 project, GS1 Japan developed a new series of EPCIS seminars for system venders and users. The seminars were part of the above-mentioned initiatives, and were launched to improve the awareness of EPCIS. The seminars were designed with Auto-ID Lab Japan. The first one was hands on seminar held in May 2013. The participants learned how to build an EPCIS environment using EPCIS commands.

The second one was held in December 2013 provided participants with an overview of EPCIS, and its advantages, while clearing up any misunderstandings surrounding it.

The third one was an EPCIS practical seminar in February 2014. 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. In the future, it will be important to cultivate understanding among company sales staff and executives, for the construction of EPCIS systems. As part of this effort, EPCIS guidebooks were prepared based on the content of the EPCIS overview seminar.

Fig. 4.2.2-1 EPCIS Guidebooks

4.3 Industry Business Use Cases

4.3.1 Apparel industry: Item level tagging use case

I.T.'S. international is a Japanese private-label clothing and accessory manufacturer founded in 2009. In addi-

tion to designing and manufacturing its own line, I.T.'S. also has a chain of retail stores, the first of which opened in the heart of Tokyo's Harajuku fashion district in February 2010. As of April 2014, there were 10 I.T.'S. stores in operation.

I.T.'S. was an early adopter of EPC. The company's management realized that the many advantages this technology could bring to their stock management, store operations and logistics, and decided to use it as a competitive advantage. As a result, they were the first company in Japan to implement UHF item-level tagging. In every I.T.'S. store, every single item-jackets, skirts, trousers, socks-has a hangtag or product label with an EPC tag embedded in it.

Stock-taking is efficient for store employees. EPC tags encoded with GS1 Serialized Global Trade Item Numbers (SGTINs) are attached to individual articles at the manufacturing factories. They are first read when clothing items arrive at distribution centers. Once the shipment is received and contents are verified, each carton of items is labeled with an EPC/RFID tag. This tag is encoded with a GS1 Serial Shipping Container Code (SSCC), uniquely identifying it as a logistics unit. This allows the entire carton to be inspected in seconds when it arrives at a retail shop, simply by scanning the label with a handheld EPC/RFID reader. The tags on the individual items of clothing enable a full-store inventory to be taken at any time in just a few hours.

I.T.'S. has achieved significant benefits by deploying this solution, saving time and money on store operations. Their store each stocks about 15,000 items. Performing a store inventory without this system would likely take two employees four days to complete. With the system in place, a single person can take a complete storewide inventory in less than two hours. The shops now take inventory every month to ensure increased inventory accuracy.

The EPC/RFID system does not only benefit workers in I.T.'S. stores-their shoppers are also seeing a noticeable difference. In I.T.'S. boutiques equipped with this system, when a customer brings articles of clothing to the check-out counter to purchase them, a clerk simply places the items on the countertop and the total price appears instantly on the cash register. The points of sale are equipped with RFID scanners that immediately read the customer's items and calculate the amount to be paid.

I.T.'S. is expanding its presence in Tokyo, and all new shops will be equipped with this system. The company is also looking to take advantage of other services made possible by the item-level EPC/RFID tags that are already on their products, such as smart fitting rooms, which would suggest other items that would match what the shopper is trying on, or RFID-based Electronic Article Surveillance to prevent shoplifting.

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

Fig. 4.3.1-1 I.T.'S. international shop, inventory-taking and EPC hangtag in the shop

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

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 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 February 2014, this system has been implemented by 11 companies at 83 distribution centers and EPC/RFID tags have been attached to about 359,000 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.

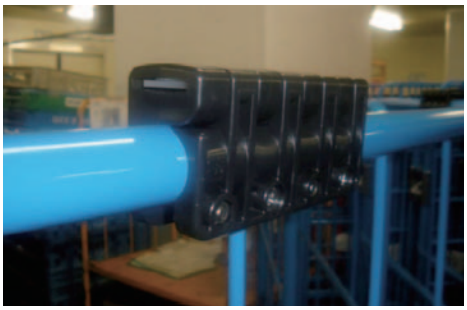
To track the location of the trolley, the EPC tag is scanned during shipping and receiving. During shipping, the barcode of the delivery point is scanned with a handheld reader. This reader is also used to scan the EPC tag. This creates an association between the delivery point and the trolley used. 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.

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

4.3.4 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 21 titles with total 2.6million 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.

Moves to introduce RFID tags have begun not only in publishing companies but also in bookstores. Maruzen Bookstores Co., started tagging its stocks of foreign publications at its Marunouchi main store on January 2011. The tagged publications amount to approximately 600,000 copies. The tagged books are staff-friendly. First of all, every book can be efficiently identified. It was not easy for shop associate to find a requested book on the shelves because the books and their titles are written in various foreign languages. By passing a handheld RFID reader over the books on the shelves, associate can locate a given title because the reader beeps when it reads the designated book tag. In addition, the RFID function of reading the data instantaneously can help the associate know the actual inventory and prevent lost sales opportunities. For example, important customers who usually purchase foreign books in volume request the list of available books in advance. Associate reads the tags of the book in the store and update inventory data because inventory data may not always be accurate. The store can provide the customers accurate list on the day referring the data. This is an advantage that cannot be provided by a POS sales reports or a barcode system. Maruzen Bookstores Co., is planning to apply this RFID functions to enable effective shelf management for foreign books. At present, floor

Fig. 4.3.4-1 Tagged books and process of checking books returned from bookstores

Fig. 4.3.4-2 Reading EPC tags in the bookstore (Inventory-taking and checkout at POS)

space for foreign books limited and so is their sales Moreover, it is difficult to employ personnel who are familiar with foreign books, especially in regional cities.

However, RFID function enables to identify every book in shelves easily, instantaneously, and constantly. So Maruzen Bookstores Co., is considering to have the local shops scan and send the data of foreign books on the shelves periodically to the expert foregin book associates in the headquarter. Then the expert associates would review the data and advise on the effective shelf management including the book selection and layout in the shelve.

5. Industry Engagement

5.1 Healthcare

5.1.1 Pharmaceutical products

5.1.1.1 Medical Prescription (Rx)

Medical errors and accidents happen so frequently that the need to standardize the supply chain from manufacturers to patients is widely recognized in the healthcare industry. And the Ministry of Health, Labour and Welfare (MHLW) announced an invitation for public comments on the draft "Implementation Guideline for Bar-coding of Prescription Drugs" in March 2006. This guideline was drafted with the cooperation of FPMAJ (*1) and GS1 Japan. After gathering various comments from the public up until June, MHLW announced the guideline in September 2006.

This guideline adopts GS1-128, GS1 DataBar Limited and GS1 DataBar Limited Composite Symbology as well as GS1 DataBar Stacked and GS1 DataBar Stacked Composite Symbology as shown in Fig. 4.1.1.1-1. MHLW decided to start full application of the Guideline in September 2008. For this reason, from spring to summer of 2008 labeling using the GS1 Standard System has been introduced at the plants of most domestic pharmaceutical manufacturers. The guideline requires the labeling of GTIN, expiration date and lot number on biological products only, but pharmaceutical manufacturers have also begun labeling other products such as general injections and drugs for internal use on a voluntary basis. Significant effects of the labeling are anticipated. The Guideline was revised in June 2012. To further ensure compliance with international standards throughout the entire industry, the Guideline requires that dispensing unit (primary packaging) e.g., PTP sheets (Press-Through Package sheets: blister sheet) be barcoded with a GS1 DataBar encoding appropriate GTIN.

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.

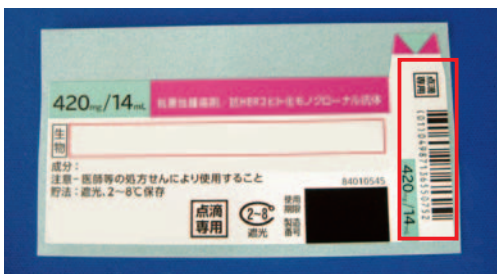
5.1.2 Medical devices

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 GS1Japan. However, the use of these standards had been optional for each company. In March 2003,

Fig. 5.1.1.1-1 GS1 Barcode on pharmaceutical product packages

GS1-128



GS1 DataBar Limited

GS1 DataBar composite

*1 The FPAMJ Federation of Pharmaceutical Manufacturers' Association of Japan

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.
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 where 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 2012, 80% of medical devices marketing in Japan are registered in MEDIS-DC database and 97.6% are shipped with GS1-128 symbol labels as shown below.

5.1.2.3 Direct marking for surgical instruments

Japan Association of Medical Equipment Industries (JAMEI; Current organisation name is "Japan Association of Medical Device Industries (JAMDI)") published the first guideline for laser marking 2D symbols on surgical instruments for the purpose of patient safety, traceability and effective stock control at the hospitals in November 2006. Since QR code is ISO standardized and so popular in Japan, JAMEI had selected QR code in addition to DataMatrix as standard for 2D data carrier.
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.

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

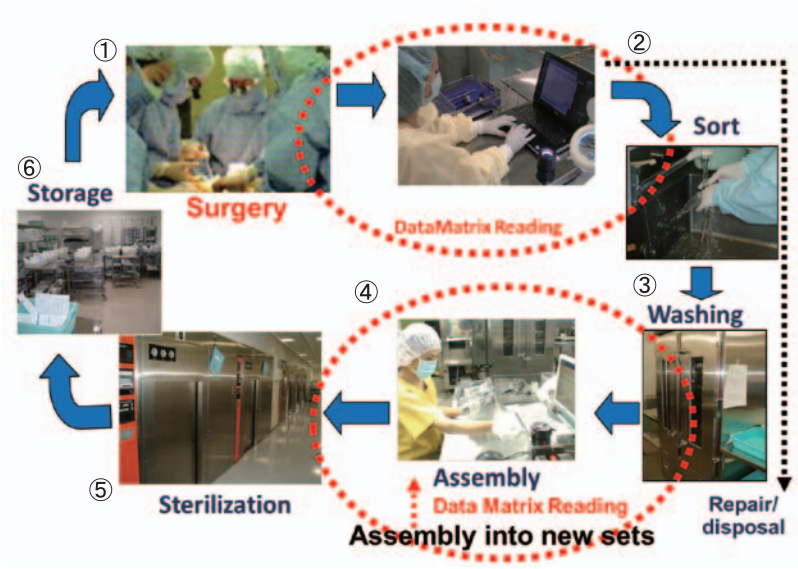
5.1.3 NTT Medical Center Tokyo Case Study — Traceability initiative of hospital asset management using GS1 Standards—

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 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 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

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.

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

(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 (Figure 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

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

GS1 Standard – 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>

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 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, 2-D 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
- 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

Fig. 5.1.4.3-1 Governing structure

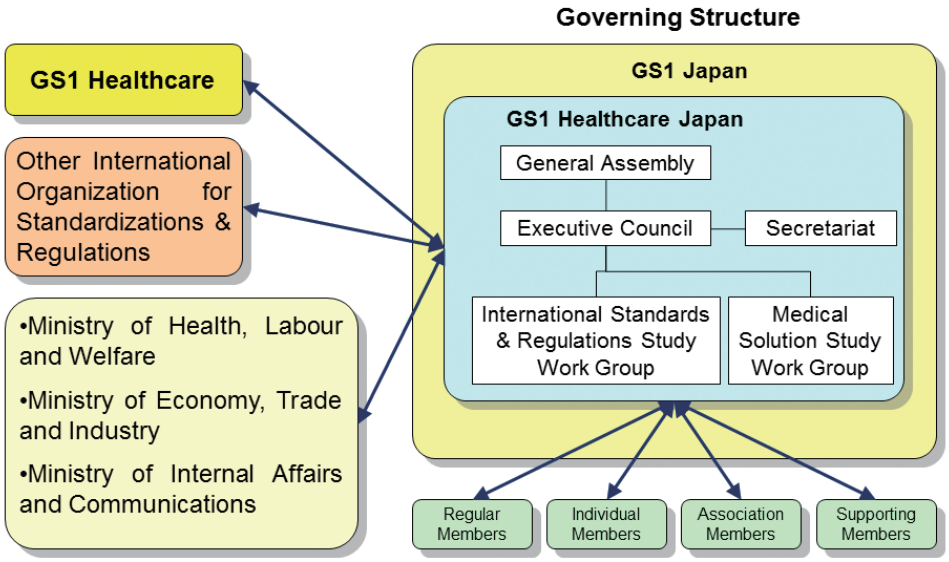


Fig. 5.1.4.3-2 General Assembly

Fig. 5.1.4.3-3 GS1 Japan Delegation team

Work Groups explained here below;

1. International Standards & Regulations Study Work Group (154 members, May. 2014) Keep watching international trends and work with MHLW to facilitate introduction of medical safety system to medical facilities.
2. Medical Solution Study Work Group (59 members, May. 2014)
   Let medical service providers aware of importance of GS1 system for facilitating implementation parallely with the lobbing activities.

5.2 Mobile

The following section explains advanced solutions adopting mobile phone and/or QR codes. Specific cases are also explained.

5.2.1 Smart ticket service using Security QR codes (SQRC)

Shiki Theatre Company has nine theatres throughout Japan and stages about 3,000 performances per year including both overseas and original musicals.
In July 2010, the company started a ticketless service called Shiki Theatre Company Smart Ticket in its Natsu Theatre using Security QR codes (SQRC) developed by Denso Wave Incorporated in 2007. By April 2011 the Smart Ticket was introduced in all of the Shiki theatre venues throughout Japan.
Shiki enhanced security by adopting SQRC instead of normal QR codes to prevent purchases for reselling purposes and counterfeit tickets.
The mechanism is as described below. Users purchase tickets on Shiki's online Ticket reservation website. When purchasing, they request to receive SQRC Tickets by mobile phone.
The SQRC Reader Admission System consisting of an SQRC reader, a screen, and a printer (Fig. 5.2.1-1) is installed in each theatre. Audience are allowed admission after the QR Ticket displayed on their mobile phone is successfully scanned with the SQRC reader. If users call in their reservations by phone, they receive paper tickets by postal mail on which the SQRC is printed, so they can be admitted by scanning the paper SQRC with the reader. When the reader scans the SQRC, a seating chart is output from the printer. As the number of users increase, the system will gain recognition and smoother admission procedures are expected in the future.

Fig. 5.2.1-1 Smart ticket usage image

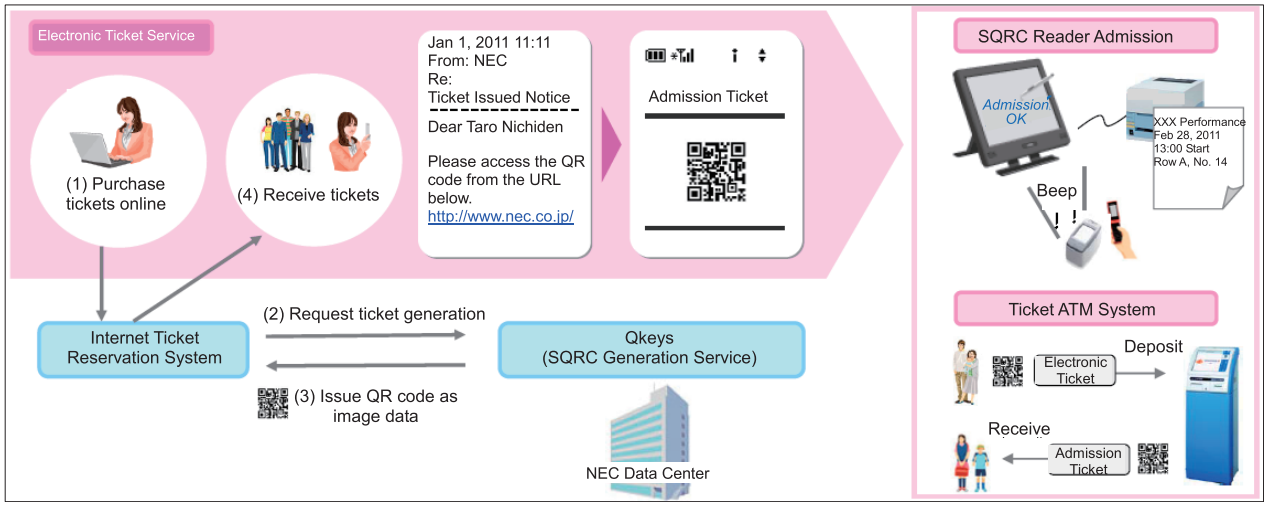


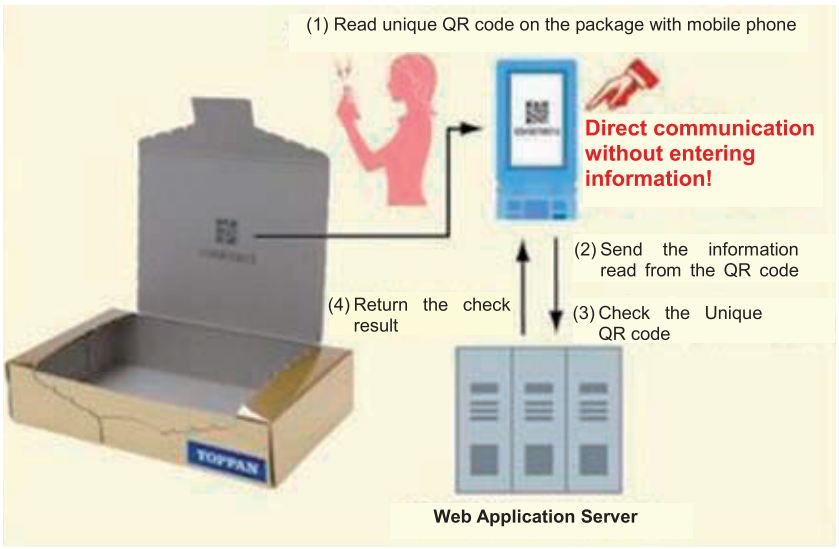
Fig. 5.2.1-2 Admission system installed at the entrance of the theatre

5.2.2 Prize promotion using QR codes and mobile phones

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 need-

Fig. 5.2.2-1 Products using unique QR codes

Fig. 5.2.2-2 Image of Unique QR codes usage



ing to manually enter the website URL and serial numbers.

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 requires the consumer to key enter the unique number.

5.2.3 Inventory management system using mobile phones

Muse, a retail store operated by Hakutsuru Sake Brewing Co., Ltd., is a specialty store that deals with a wide range of products from low-inventory products such as sake cups handmade by potters to supplementary products such as appetizers and snacks. The store has improved its inventory management using mobile phones with barcode readers and cloud services. Product master data of all the products sold in the store are registered in mobile phones.

When a product barcode is scanned with a mobile phone, the phone displays the product information. Therefore, inventory-taking is done by entering the quantity in the phone. Placing orders requires scanning barcodes, entering quantities, and selecting business partners. The mobile phones themselves do not have a function to check for value errors, but instead the business package system checks them. Introducing this inventory management system using mobile phones made it possible to complete the

Fig. 5.2.3-1 Mobile inventry management system

Muse

Mobile phone with barcode reader

inventory-taking within 6 hours. Before adopting the system, it took 2 days for inventory management. In addition, since mobile phones are more compact and lighter to use than dedicated terminals, the inventory-taking was easier to perform.

5.2.4 GS1 Extended Packaging Data Structure Solution

5.2.4.1 GS1 Extended Packaging data solution for promotion

Mandom, a manufacturer of men's cosmetics, ran a marketing campaign exclusive to a drug store chain for 8 weeks in 2012. Mandom decided to use the data structure of URL with GTIN. This is the data string that GS1 Extended Packaging designates to be generated after scanning GS1 QR Code or GS1 DataMatrix. The target products in the campaign were seven types of hair waxes for men. The company thought that it could efficiently obtain information on consumers who participate in the campaign by the specific products they bought. Mandom sold these hair waxes by adding to each product's package an application card on which a QR code combining the brand URL and GTIN was printed. Before using this QR code application, Mandom had
run its marketing campaigns for men's cosmetics using postcards. Mandom 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.

The company's change to the use of QR codes brought about an increase in the number of applicants. Using the data structure of URL with product GTIN facilitated the tasks of checking and summarizing the participation results by each GTIN. Hiroto Furuya, Publicity and Sales Promotion Department, Mandom, comments on this campaign.

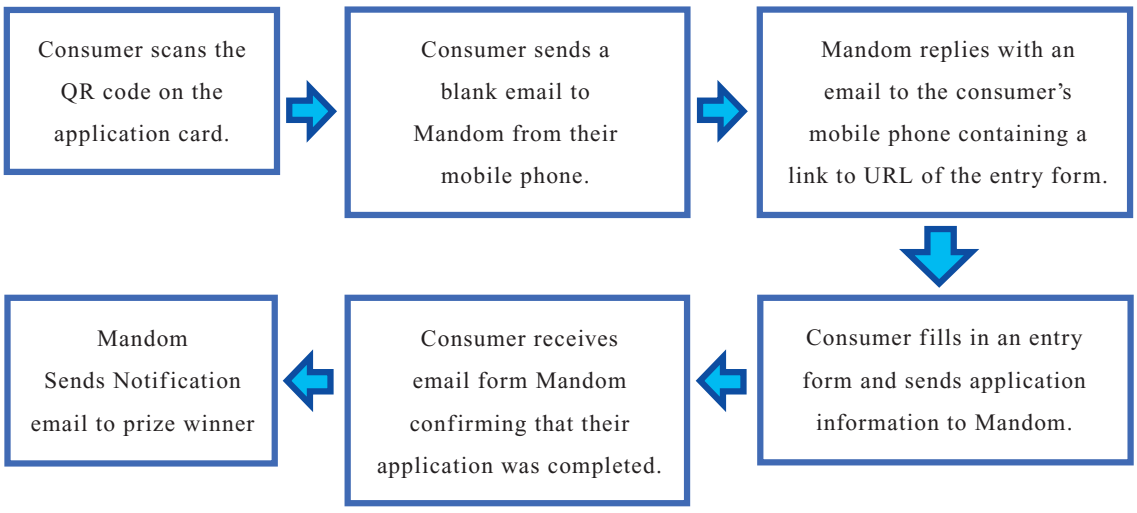
"When I first learned about the GS1 QR code, I knew immediately that we could use it for our sales promotions. A particularly attractive advantage is that the new format of QR code includes a unique GTIN linked with a product. We can analyze this information in combination with store POS data during a campaign and the data can be used for post-sales marketing. We are always looking for new sales promotion methods, and hope to continue to find ways to extend the use of this method in the future. We feel that GS1 QR codes have great potential. We expect that specialized software for reading GS1 QR codes will be developed soon."

Fig. 5.2.4.1-1 Promotion application card

5.2.4.2 GS1 Extended Packaging data solution for used products

Used product market is growing in Japan. It is important for brand owners to reach the users and provide user manual and recall information even on used products. Sometimes, as for used products, sufficient product safety information is not provided or user

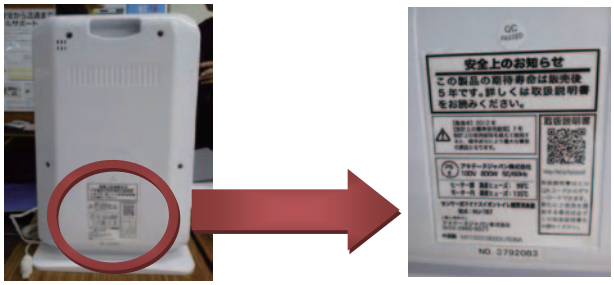
Fig. 5.2.4.1-2 Process flow of mandom's promotion



manuals are lost. In the Japanese market, as a national policy for consumer protection, the government accelerates mandatory recalls, and voluntary recalls, if a product has suspected defects, illegal labeling, misleading labeling, or other features which might adversely affect consumer safety and security.
The Japan Technical Designers Association (JTDNA) (*1), a nonprofit organization that sets quality guideline of product user manual, announced on August 1, 2013 that it will proceed with a pilot using the QR codes to meet Product Liability requirements including providing user manuals to users and obtaining user information. The pilot will be conducted as follows:
Two types of QR codes are prepared: one is displayed on the body of product and the other on the product's user manual for different purposes.

Purpose 1: Retrieval of user manual
This pilot uses conventional QR codes because some mobile phones are not yet capable of reading GS1 QR codes. Since the products used for this pilot are not assigned a GTIN, the company URL and a product name is encoded to indicate the product instead of a GTIN. Users can obtain the user manual in PDF format by scanning the QR code on the product body. The manual has been specially designed so that it is small in size for the phone to download and the information is easy to read on the display of a smartphone.
The manual was verified by JTDNA in advance and carries a certification mark for the predefined quality.

Fig. 5.2.4.2-1 A label with QR code



Purpose 2: Registration of user information
The QR code on the manual is used for user registration. The person who bought used product doesn't have a way to register user information. One of JTDNA's member companies conduct pilot test to obtain users' information for used products. When users buy the used product, they can scan QR code on the product's manual by mobile device. The device shows user's registration site where uses are requested to enter their e-mail. After their registration, they will receive information on recalls, replacements recommendation, etc.
After the pilot, they plan to introduce GS1 QR code in the future.
Some of major mail-order companies are also interested in this registration process.

5.2.4.3 Promoting GS1 Extended Packaging solutions

5.2.4.3.1 Development of GS1 QR code reading demonstration software

In order to promote Extended Packaging solution, we need to demonstrate its value by showing examples how it works and helps brand owners communicate with consumers to the 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. For this purpose, GS1 Japan developed software for iOS with the help of Denso Wave Inc. The software reads GS1 QR Code and processes the data per GS1 Standards. Additional feature of resolving lot number together with GTIN with URL is incorporated. The software supports only an iOS-compatible device now. We plan to develop Android-compatible version in the near future.

Fig. 5.2.4.3.1-1 Image of GS1 QR code reader program

Fig. 5.2.4.3.1-2 Promotional brochure

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

5.2.4.3.2 Reaching out to potential users

GS1 Japan takes advantage of various occasions including seminars and industry exhibitions to promote the Extended Packaging solution. We organized a mobile seminar in March 2014. The topics included GS1 B2C Standards Development and Benefit of GS1 Extended Packaging for consumer goods promotion. More than 120 people attended the seminar.

GS1 Japan participates in several industry exhibitions including Retail Technology Exhibition and Wireless Communications Exhibition. In every occasion, Extended Packaging solution is explained using the demonstration software. We also published a flyer explaining the business cases of Extended Packaging application in paper and online.

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 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

Fig. 5.3.1-1 Japanese beef traceability system

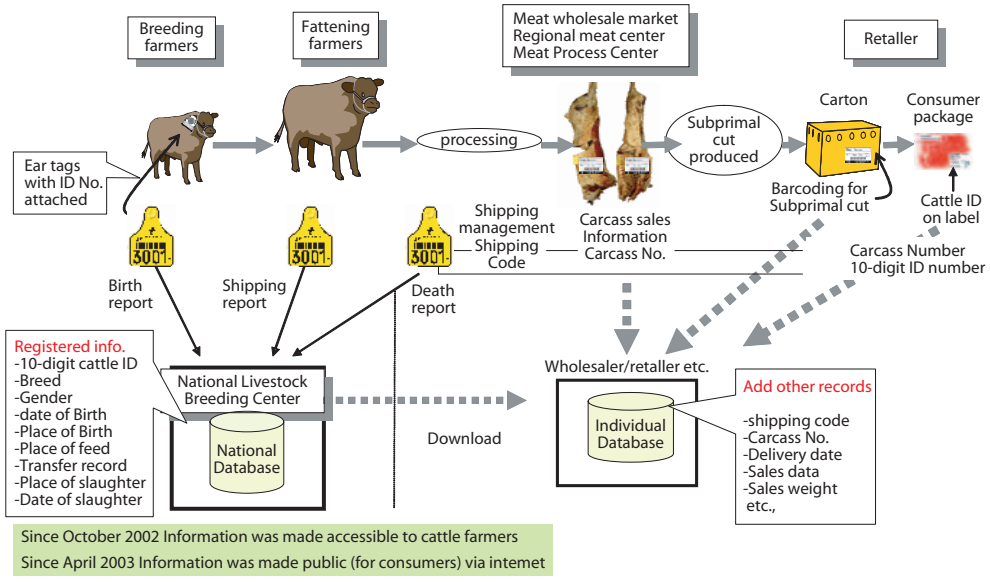
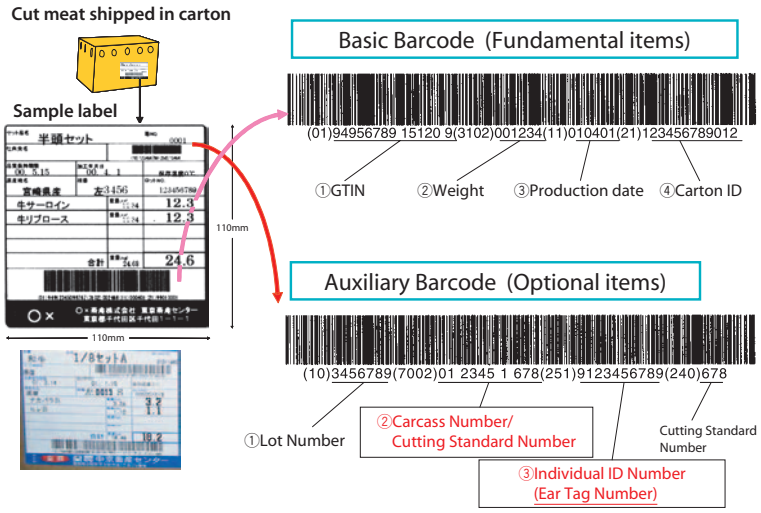


Fig. 5.3.1-2 Ear tag

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



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. 4.2.1-3) 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 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.

Fig. 5.3.4-1 Operation changes

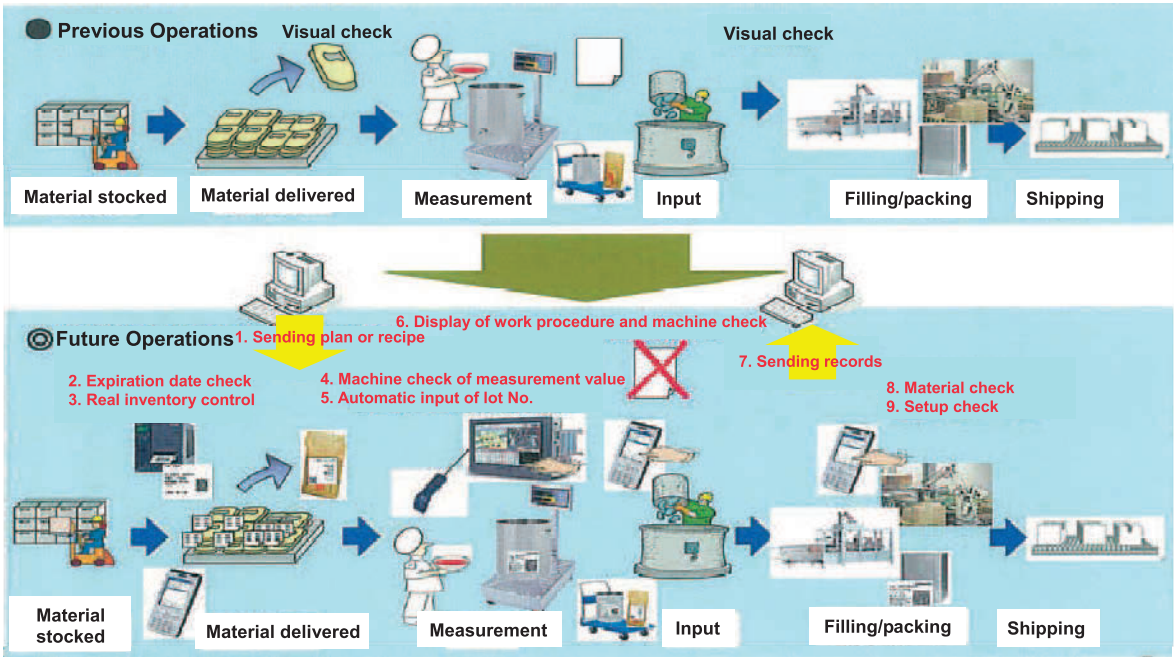


Fig. 5.3.4-2 Encoded information

- GTIN : AI (01)
- Production Date : AI (11)
- Expiry Date : AI (17)
- Lot Number : AI (10)

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 (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.

Fig. 5.4-1 Sample payment slip

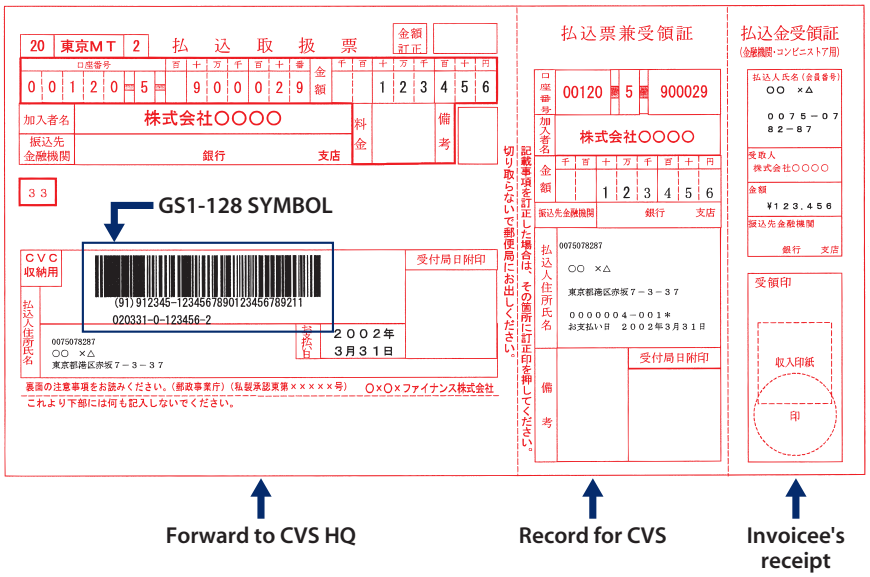


Fig. 5.4-2 Code structure (44 digits) for payment slip

(91)	MMMMMM	EEEEEEEEEEEEEEEEEEEE	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

6. Study Groups

6.1 Supply Chain Information Systems

We have a membership-based workshop engaging in systematization of distribution information promoted by GS1 Japan since 1977.
This study group holds bimonthly seminars on various topics such as global standardization, state-of-the art technology, implementation case studies and overseas trends. It also organizes study tours and discussion sessions. The workshop functions as an information exchange between members and GS1 Japan, as well as between the members themselves.

In FY 2013, seminars were held on the following subjects for about 60 member companies.

- Latest developments in Ryutsu BMS
- GS1 Standards development and GS1 QR code business case
- EPC/RFID business cases
- Latest information distribution systems implemented by member companies
- POS data utilization case study
- Omni-Channel Retailing adoption case
- Food safety and security and environmental measures (factory tour)

Fig. 6.1-1 Workshop

6.2 ICT-Oriented Wholesale Industry

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 "Enhancing wholesale function as a social infrastructure through collaborative efforts", the study group worked on the following 5 topics in FY2013.

- Wholesaler BCP (Business continuity planning) / BCM (Business continuity management): Study focused on cooperation with manufacturers
- Promotion of Ryutsu BMS standard adoption: Study focused on proposals and awareness-raising
- Applications of smart devices
- Applications of big data and cloud computing
- Cost reduction for information systems

Fig. 6.2-1 ICT-Oriented wholesale industry forum

6.3 Information Systems in Food, Beverage, and Alcohol Industry

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 70 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 FY 2013, the working groups addressed three topics: 1) follow-up on product returns reduction, 2) marking just the expiry month and year and lead time optimization, and 3) making product information exchange more efficient.

The first topic is an ongoing theme since the Council's inception. It involves sharing information on better practices for returns reduction, ongoing investigation of the actual returns situation, and follow-up on results of a returns reduction plan implemented by participating companies.

The second topic is an initiative for increasing distribution efficiency. The products with longer best before date are allowed to carry only best before month. However, manufactures such products often mark the date. Marking just the month and year will

Fig. 6.4-1 General meeting and forum of The Collaborative Council of Manufacturers, Wholesalers, and Retailers

simplify inventory management, avoid reverse shipment, and expected to improve distribution efficiency.
The third topic is how to exchange product master and image information efficiently across the industry. While the use of industry databases is advancing between manufactures and wholesalers, it is still common for such information to be exchanged individually between wholesalers and retailers. The group also discussed the exchange of more detailed product information such as allergen and ingredients as a new requirement.

The Council has a three-tier meeting structure consisting of a general meeting, steering committee, and working groups to enable the integrated promotion of management policies and on-site improvements. The Council reported its output at the "General Meeting and Forum of the Collaborative Council of Manufacturers, Wholesalers, and Retailers" in July 2014. The executive management of each company confirmed their responsibility for their activities and will lead specific on-site improvements and innovations within the company.

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 2013, 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:

- New-Year 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 2013–2014
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.

Fig.7.2-1 GS1 Japan publications

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 medium-sized 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.
	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.
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

10. Reference

10.1 Structure and Aspects of Japanese Supply Chain

Supply chains in Japan are said to have been lengthy, complicated, and low in productivity. For example, Fujiya Morishita, a leading expert in post-war studies of Japanese supply chains, described traditional supply chains in Japan as being comprised of small-scale, excessive, pre-modern, family-run businesses with low productivity in retailing, and roundabout, multi-stage systems in wholesaling.

- Recent Developments

In the past thirty years, however, supply chains in Japan have greatly changed. There are two factors involved: changes in the circumstances surrounding supply chains and changes in the supply chains themselves.

Changes in the circumstances surrounding supply chains

Next, the following are factors related to changes in the supply chains themselves. First, there are the growth of large-scale retailers and changes in main types of business. While family-run small-scale businesses have decreased substantially, large-scale retailers have grown even larger. Moreover, while department stores and general merchandise stores (GMSs) used to be the main types of retailers in the past, recently drugstores, mass merchandisers of consumer electronics, fast fashion stores and other types of retailers have enjoyed high growth. Most of these types of business have been increasing their sales through low pricing.

Second, the centers of commerce have shifted from city centers to the suburbs. Three so-called laws related to community development were enacted in 2000: the Act on the Measures by Large-Scale Retail Stores for Preservation of Living Environment (Large-Scale Retail Stores Location Law), the City Planning Act, and the Act on the Improvement and Vitalization of City Centers. These laws deregulated the opening of new stores and accelerated the construction of large-scale retail stores in the suburbs where regulations were less strict, and this in turn resulted in the decline in commerce in city centers. Therefore, the nationwide decline in city centers has come under close scrutiny as a major issue. As a result, the City Planning Act and the Act on Vitalization in City Centers were amended and the guidelines for the Large-Scale Retail Stores Location Law were revised in 2006 to regulate excessive development in the suburbs and revitalize city centers. Vitalization in city centers is once again seeing forward movement.

Changes in the supply chains themselves

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Recent trends according to statistics

As mentioned above, the retail sector has seen the growth of large-scale retailers and suburban stores.

On the other hand, small-scale retailers located in city centers have been decreasing in the number of establishments as well as their sales. This is also shown in a large-scale survey by the Ministry of Economy, Trade

and Industry (METI), which is intended to determine current developments of commerce in Japan (Census of Commerce). Although there were some revision on the laws to regulate excessive development in suburbs and to revitalize city centers in 2006, it is impossible to say that the speed of decline in commerce in city centers has been slowing down at the time of the 2007 survey,

The Census classifies commercial locations into five areas: Commerce-integrated; Office building; Residential; Industrial; and Other. Among them, the Commerce-integrated area is further broken down into five types: Around-station; City-area; Residentialbackground; Roadside; and Other. The term "city centers" corresponds to Around-station-type and City-area-type under the category of Commerceintegrated area. And both of these two types of locations have experienced decrease in the number of establishments, annual sales, the number of people engaged, and sales floor spaces.

The Census also shows that establishments with one to four persons engaged have experienced decrease in their numbers and annual sales, irrespective of their locations.

On the other hand, it shows that Roadside-type which could be described as the symbol of suburbanization as well as areas including Office-complex and Industrial, which indicate the diversification of location, have seen increase in the number of medium- to large-scale establishments and their sales.

Table 10.1-1 Recent trends

Site characteristic	2007								
	Small-scale establishments (4 or less employees)			Medium-scale establishments (5 to 49 employees)			Large-scale establishments (50 employees or more)		
	Number of establishments	Composition ratio (%)	Comparison(%)	Number of establishments	Composition ratio (%)	Comparison(%)	Number of establishments	Composition ratio (%)	Comparison(%)
Total retail trade	742,342	65.2	-10.4	379,257	33.3	-3.7	16,260	1.4	1.4
Commerce-integrated areas	278,965	65.3	-11.3	142,443	33.3	-4.5	6,055	1.4	-2.4
Station-area type	94,217	62.5	-11	54,472	36.1	-4.2	2,166	1.4	-6.3
Urban-area type	70,297	69.6	-11.4	29,618	29.3	-9.5	1,050	1	-6.3
Residential-background type	87,252	71.5	-12.9	33,213	27.2	-10.2	1,551	1.3	-4.8
Roadside type	17,682	44.2	-2.2	21,140	52.8	15.9	1,179	2.9	16
Other type	9,517	69.8	-14.5	4,000	29.4	-7.2	109	0.8	-16.2
Office-building areas	58,309	64.4	-4.4	31,077	34.3	-0.4	1,150	1.3	6.3
Residential areas	219,956	64.7	-11.7	114,523	33.7	-7.4	5,360	1.6	-4.1
Industrial areas	32,298	49.4	-6.4	31,208	47.7	6.6	1,932	3	18.7
Other areas	152,814	71.2	-9.7	60,006	28	-0.8	1,763	0.8	14.8

Data Source: 2007 Census of Commerce: Results by Site Characteristics , METI

Site characteristic	2007								
	Small-scale establishments (4 or less employees)			Medium-scale establishments (5 to 49 employees)			Large-scale establishments (50 or more employees)		
	Annual sales (million yen)	Composition ratio (%)	Comparison(%)	Annual sales (million yen)	Composition ratio (%)	Comparison (%)	Annual sales (million yen)	Composition ratio (%)	Comparison (%)
Total retail trade	17,926,047	100.0	-6.3	76,701,680	100.0	2.6	40,077,721	100.0	1.8
Commerce-integrated areas	6,940,388	38.7	-8.3	23,829,403	31.1	-0.8	22,369,868	55.8	-2.3
Station-area type	2,529,193	14.1	-9.1	8,587,212	11.3	-0.6	10,388,877	25.9	-3.3
Urban-area type	1,791,119	10	-5.9	4,716,860	6.1	-6.8	5,058,875	12.6	-5
Residential-background type	1,769,924	9.9	-12.2	5,659,855	7.4	-5.5	3,202,491	8	-6.9
Roadside type	650,317	3.6	2.9	4,276,518	5.6	16.1	3,453,118	8.6	12.9
Other type	199,835	1.1	-15.4	585,958	0.8	-8.6	266,507	0.7	-16.5
Office-building areas	1,483,668	8.3	0.4	6,879,811	9	7.1	3,194,384	8	21.2
Residential areas	5,039,662	28.1	-8.7	24,281,068	31.7	-0.7	8,046,872	20.1	-3.8
Industrial areas	1,104,541	6.2	2.7	9,954,410	13	15.1	3,811,199	9.5	23.1
Other areas	3,357,788	18.7	-4	11,756,987	15.3	4.5	2,655,399	6.6	11.9

Data Source: 2007 Census of Commerce: Results by Site Characteristics , METI

10.2 Statistics on Japanese Retail Industry

Table 10.2-1 Summary of the commerce statistics

Industrial Category	2004	2007	2004/2007 Growth (%)
Total No. of stores	1,613,318	1,472,658	-8.9
Wholesalers	375,269	334,799	-10.8
Retailers	1,238,049	1,137,859	-8.1
Total No. of employees	11,565,953	11,105,669	-4.2
Wholesalers	3,803,652	3,526,306	-7.3
Retailers	7,762,301	7,579,363	-2.4
Total of Annual Sales (¥Million)	538,775,810	548,237,119	1.7
Wholesalers	405,497,180	413,531,671	2.0
Retailers	133,278,631	134,705,448	1.1

The source : METI (Ministry of Economy, Trade and Industry) "The Census for Commerce" 2007

Table 10.2-2 Number of Japanese retailers and wholesalers by the number of employees

Industry	Number of employees	2004	2007	2007 Composition Ratio (%)	2004/2007 Growth (%)
Wholesale Trade	1 - 2	86,429	77,132	23.1	-10.8
	3 - 4	89,706	78,316	23.4	-12.7
	5 - 9	102,908	90,552	27.1	-12.0
	10 - 19	57,343	51,959	15.5	-9.4
	20 - 29	17,587	16,216	4.9	-7.8
	30 - 49	12,003	11,257	3.4	-6.2
	(Subtotal)	365,976	325,432	97.4	-11.1
	50 - 99	6,459	6,069	1.8	-6.0
	100-	2,834	2,739	0.8	-3.4
	(Subtotal)	9,293	8,808	2.6	-5.2
	Total	**375,269**	**334,240**	**100.0**	**-10.9**
Retail Trade	1 - 2	568,816	503,512	44.3	-11.5
	3 - 4	284,060	252,478	22.2	-11.1
	5 - 9	207,674	201,585	17.7	-2.9
	10 - 19	112,380	114,041	10.0	1.5
	20 - 29	32,696	32,301	2.8	-1.2
	30 - 49	17,477	17,208	1.5	-1.5
	(Subtotal)	1,223,103	1,121,125	98.6	-8.3
	50 - 99	10,437	10,854	1.0	4.0
	100 -	4,509	4,776	0.4	5.9
	(Subtotal)	14,946	15,630	1.4	4.6
	Total	**1,238,049**	**1,136,755**	**100.0**	**-8.2**

The source : METI (Ministry of Economy, Trade and Industry) "The Census for Commerce" 2007

Table 10.2-3 Number and sales of retail stores by type of business

Type of Stores	Total No. of stores in 2004	Total No. of stores in 2007	04/07 Growth (%)	2004 Sales ¥Million	2007 Sales ¥Million	04/07 Growth (%)
Total	1,238,049	1,137,859	-8.1	133,278,631	134,705,448	1.1
Department stores	308	271	-12.0	8,002,348	7,708,768	-3.7
[1] Large Department stores	276	247	-10.5	7,668,578	7,323,980	-4.5
[2] Other Department stores	32	24	-25.0	333,770	384,789	15.3
General Supermarkets	1,675	1,585	-5.4	8,406,380	7,446,736	-11.4
[1] Large supermarkets	1,496	1,380	-7.8	7,949,605	6,947,294	-12.6
[2] Medium supermarkets	179	205	14.5	456,775	499,442	9.3
Specialty supermarkets	36,220	35,512	-2.0	24,101,939	23,796,085	-1.3
[1] Apparel	5,991	7,153	19.4	1,544,556	1,680,800	8.8
[2]Grocery	18,485	17,865	-3.4	17,046,994	17,106,265	0.3
[3] Homefurnishing	11,744	10,494	-10.6	5,510,389	5,009,020	-9.1
Convenience Stores	42,738	43,684	2.2	6,922,202	7,006,872	1.2
Drugstore	13,095	12,701	-3.0	2,587,834	3,012,637	16.4
Other supermarkets	56,211	55,615	-1.1	5,480,581	5,949,303	8.6
Specialty stores	726,825	694,578	-4.4	49,970,253	53,929,117	7.9
[1] Apparel stores	95,497	94,954	-0.6	3,972,502	4,074,004	2.6
[2] Grocery stores	190,788	176,575	-7.4	7,023,157	7,218,837	2.8
[3] Homefurnishing stores	440,540	423,049	-4.0	38,974,594	42,636,275	9.4
Other retail stores	360,977	293,913	-18.6	27,807,094	25,855,930	-7.0

The source : METI (Ministry of Economy, Trade and Industry) "The Census for Commerce" 2007

Table 10.2-4 Top 20 wholesale companies in Japan

(As of 2012)

2012	2011	Company Name	Location of Head Office	Annual sales (¥Million)	Annual Growth (%)	Business Line
1	1	Mediceo Paltac Holdings	Tokyo	2,810,959	2.2	Drugs
2	2	Alfresa Holdings	Tokyo	2,387,511	2.3	Drugs
3	3	Mitsubishi Shokuhin	Tokyo	2,318,873	7.8	Grocery
4	4	Suzuken	Aichi	1,894,594	1.9	Drugs
5	5	Nippon Access	Tokyo	1,621,474	2.5	Grocery
6	6	Kokubu	Tokyo	1,502,325	2.1	Grocery
7	7	Toho Holdings	Tokyo	1,140,364	2.9	Drugs
8	9	Kato Sangyo	Hyogo	720,258	2.5	Grocery
9	8	Nihon Shuppan Hanbai	Tokyo	704,449	0.1	Books/Audio/Video/Music Instruments
10	-	Mitsui Foods	Tokyo	634,676	-	Grocery
11	10	Arata	Chiba	616,327	1.6	Sundry Goods/Medical Supplies
12	11	Itochu Shokuhin	Osaka	614,512	3.7	Grocery
13	12	Vital KSK Holdings	Tokyo	547,581	1.1	Drugs
14	13	Tohan	Tokyo	503,484	-2.1	Books/Audio/Video/Music Instruments
15	14	Nihon Shurui Hanbai	Tokyo	500,003	1.4	Grocery
16	15	Forest Holdings	Oita	414,238	-0.1	Drugs
17	-	Asahi Shokuhin	Kochi	379,074	-	Grocery
18	16	World	Hyogo	336,480	2.0	Textile
19	17	YAMAE HISANO	Fukuoka	313,576	5.1	Grocery
20	-	ASICS	Hyogo	260,198	5.0	Sporting goods

The source : The Nikkei Marketing Journal

Table 10.2-5 Top 20 retail companies in Japan

(As of 2012)

2012	2011	Company Name	Type of business	Location of Head office	Annual sales (¥Million)	Growth (%)
1	1	Aeon	Holding Co.	Chiba	5,685,303	8.8
2	2	Seven & I Holdings	Holding Co.	Tokyo	4,991,642	4.3
*	*	Aeon Retail	Supermarket	Chiba	2,153,600	-
3	3	Yamada Denki	Specialty store	Gunma	1,701,489	-7.3
-	-	Ito-Yokado	Supermarket	Tokyo	1,332,291	-2.1
4	4	Isetan Mitsukoshi Holdings	Holding Co.	Tokyo	1,236,333	-0.3
5	6	J. Front Retailing	Holding Co.	Tokyo	1,092,756	16.1
6	5	UNY Group Holdings	Supermarket	Aichi	1,030,258	-4.5
7	9	Fast Retailing	Holding Co.	Yamaguchi	928,669	13.2
8	8	Takashimaya	Department store	Osaka	870,332	1.4
9	7	Daiei	Supermarket	Tokyo	831,293	-4.4
*	*	Sogo・Seibu	Department store	Tokyo	810,998	-2.3
10	13	Amazon Japan*	Online retailer	Tokyo	730,000	18.6
11	10	edion	Specialty store	Osaka	685,145	-9.7
*	*	Daimaru Matsuzakaya Department Stores	Department store	Tokyo	660,521	2.6
12	11	K's Holdings	Specialty store	Ibaraki	637,497	-12.2
13	12	Yodobashil-Camera	Specialty store	Tokyo	637,179	-5.1
*	*	Mitsukoshi Isetan	Department store	Tokyo	627,984	-1.5
*	*	UNICLO	Specialty store	Yamaguchi	620,063	3.3
*	*	7-11 Japan	Convenience Store	Tokyo	617,558	7.2
14	16	Don Quijote	Specialty store	Tokyo	540,255	6.4
15	15	Izumi	Supermarket	Hiroshima	535,509	3.8
16	17	H2O Retailing	Holding Co.	Osaka	525,154	3.9
17	-	Life Corporation	Supermarket	Osaka	519,941	-
18	14	Bic Camera	Specialty store	Tokyo	518,057	-15.4
19	19	SHIMAMURA	Specialty store	Saitama	492,097	5.3
20	18	Lawson	Convenience Store	Tokyo	487,445	1.8

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

The source : The Nikkei Marketing Journal

Table 10.2-6 Top 10 convenience store chains in Japan

(As of 2012)

2012	2011	Company Name	Location of Head Office	Group	Annual sales (¥Million)	No. of stores
1	1	Seven-Eleven Japan	Tokyo	Seven & I Holdings	3,508,444	15,072
2	2	Lawson	Tokyo	Mitsubishi Corporation	1,906,547	10,976
3	3	Family Mart	Tokyo	Itochu Group	1,715,279	9,481
4	4	Circle K Sankus	Tokyo	UNY Group Holdings	1,013,613	6,242
5	5	Ministop	Chiba	Aeon	352,687	2,168
6	6	Daily Yamazaki	Tokyo		225,663	1,648
7	7	Seicomart	Hokkaido	Independent	184,645	1,157
8	10	JR East Retail Net	Tokyo	East Japan Railway Company	98,224	509
9	8	Three F	Kanagawa	Independent	97,728	604
10	9	Poplar	Hiroshima	Independent	86,810	713

The source : The Nikkei Marketing Journal

Table 10.2-7 Sales by type of merchandise in department stores (As of 2013)

Type of Merchandise	Total sales (¥Million)	%
Total sales	6,217,140	100.0%
Apparel	2,128,156	34.2%
Accessories	791,133	12.7%
Household goods	302,783	4.9%
Grocery	1,733,086	27.9%
Restaurant	179,719	2.9%
Sundry goods	897,519	14.4%
Service	67,025	1.1%
Others	117,719	1.9%
(Shopping gift cards) *	(194,956)	-

(*The sales of shopping gift cards are not included in the total sales.)

The source : Japan Department Stores Association

Table 10.2-8 Sales by type of merchandise in chain stores (As of 2013)

Type of Merchandise	Total sales (¥Million)	%
Total sales	1,272,245	100.0%
Grocery	795,424	62.5%
Apparel	127,940	10.1%
Sundry goods	104,086	8.2%
Drugs & Cosmetics	42,068	3.3%
Furniture & Homefurnishing	54,486	4.3%
Home electrical appa-ratus	14,456	1.1%
Other living goods	48,415	3.8%
Service	3,954	0.3%
Others	81,416	6.4%

The source : Japan Chain Stores Association
(58 member companies and 8,321stores)

Table 10.2-9 The growth of e-commerce market in Japan (As of 2013)

Type of Merchandise		2010		2011		2012		
		Scale (¥Billion)	EC ratio	Scale (¥Billion)	EC ratio	Scale (¥Billion)	y/y	EC ratio
Retail	GMS	1,611	4.18%	1,782	4.74%	1,891	106.1%	5.05%
	Apparel & Accessories	112	0.88%	144	1.12%	175	121.5%	1.33%
	Grocery	436	0.71%	532	0.85%	605	113.7%	0.96%
	Automobile, Automobile Parts	1,222	3.47%	1,246	4.08%	1,426	114.4%	4.29%
	Furniture, Household goods							
	Electrical products							
	Drugs & Cosmetics	312	2.85%	420	3.64%	501	119.3%	4.02%
	Sporting goods, Books, Music, Toys	333	2.14%	367	2.46%	400	109.0%	2.74%
Service	Tourism	1,101	4.65%	1,270	5.47%	1,496	117.8%	6.16%
	Restaurants							
	Entertainment	126	0.81%	131	0.89%	147	112.2%	0.94%
Construction		N/A	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturing		138	N/A	119	N/A	116	97.5%	N/A
ICT		1,989	N/A	2,032	N/A	2,295	112.9%	N/A
Transport & Logistics		266	N/A	264	N/A	307	116.3%	N/A
Financial Services		71	N/A	72	N/A	68	94.4%	N/A
Wholesalers		71	N/A	80	N/A	86	107.5%	N/A
Other								
Total		7,788	N/A	8,459	N/A	9,513	112.5%	N/A
Total(Retail and Service)		5,253	2.46%	5,892	2.83%	6,641	112.7%	3.11%

The source : METI (Ministry of Economy, Trade and Industry) "FY 2012 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 10.2-10 Top 20 e-commerce (B2C) players in Japan (As of 2012)

	Company Name (Website)	Annual sales (¥Million)	Annual Growth (%)	EC ratio	Line of goods	Account Closing Month
1	Amazon Japan (amazon.co.jp)*	480,000	23.1	100%	General	Dec
2	Senshukai (bellemaison.jp)	72,672	11.2	59%	General	Dec
3	Nissen (nissen.co.jp)	69,200	7.5	52%	General	Dec
4	Dell (dell.co.jp)*	55,000	-	100%	PC	Jan
5	Joshin Denki (joshinweb.jp)*	50,000	11.1	100%	Home electrical apparatus	Mar
6	Japanet Takata (japanet.co.jp)*	46,000	-20.0	30%	Home electrical apparatus	Dec
7	Rakuten (books.rakuten.co.jp)*	37,000	12.7	100%	Books/Audio/Video	Dec
8	Ito-Yokado (itoyokado.co.jp)	35,000	16.6	100%	Grocery	Feb
9	Yodobashil-Camera(yodobashi.com)	34,284	-3.6	100%	Home electrical apparatus	Mar
10	Start Today (zozo.jp)	31,806	33.6	100%	Apparel	Mar
11	Dinos (dinos.co.jp)	29,964	14.2	53%	General	Mar
12	Sony Marketing (store.sony.jp)*	27,000	-6.9	100%	PC	Mar
13	MOA (a-price.co.jp)	26,800	24.1	100%	Home electrical apparatus	Jun
13	QVC Japan (qvc.jp)*	26,800	16.5	30%	General	Dec
15	DHC (dhc.co.jp)*	26,300	-	52%	Cosmetics/Health Foods	Jul
16	Felissimo (felissimo.co.jp)*	25,914	4.6	54%	Apparel/Accessories	Feb
17	AbelNet (pc-bomber.co.jp)	25,244	7.0	100%	Home electrical apparatus	Feb
18	Jupiter Shop Channel (shopch.jp)*	24,000	20.0	20%	General	Mar
19	Cecile (cecile.co.jp)*	23,525	-	42%	General	Mar
20	Seven & i Net Media (7netshopping.jp)*	22,800	16.9	100%	General	Feb

The source : Koubunshuppan

(*:estimate)

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