GS1 Japan Handbook 2011-2012

Message from the President

In the wake of the Great East Japan Earthquake in March, 2011 has been a year plagued with difficulties for Japan. On behalf of member firms and the staff of GS1 Japan, I would like to thank all the countries and GS1 community for their warm support and messages.

The earthquake also triggered a reaffirmation of the importance of supply chains in Japan's business circles. In addition, many Japanese companies have shifted from mature domestic markets to global markets to seek more opportunities. Under such circumstances, the GS1 system that enables the improvement of business efficiency in supply chains using international standards is growing in importance.

More than 120,000 companies have been allocated GS1 Company Prefixes in Japan and the number is increasing even today, 33 years after we began allocation in 1978. Recently, the use of the GS1 Company Prefix has gone into full swing not only in the consumer goods industry for Point-of-Sale, but also in Internet retail business and the healthcare industry.

Currently, the use of other GS1 keys and data carriers as well as GTIN is showing signs of expansion in Japan. For example, with consideration for growing consumer interest in safety and security, the use of the GS1 DataBar has started as it can accomodate larger amount of product management information such as expiration date in a small space. GS1 Japan is also actively working on its diffusion and expansion of use. GLN, which is used to identify companies and organizations, will get a boost to full-scale operation in parallel with the diffusion of the Ryutsu BMS (EDI Standard). Applications of EPC/RFID have also increased, and we will continue to promote their wider use.

As future challenges for GS1 Japan, we are studying the use of GS1 system in material transactions in the upstream supply chain of consumer products and the feasibility of combining mobile phones that are used by people of all ages with GS1 Standards in B2B and B2C transactions.

GS1 Japan will continue to support the efforts of our members to achieve business efficiency and improvement using GS1 systems and thus to bring added value to their customers. Last not but least, I hope for the further growth and success of members, GS1 MOs, and GS1 Global Office.

井上 敦

Takeshi Inoue
President
GS1 Japan

GS1 Japan Handbook 2011 – 2012
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1. BarCodes & Identification

1.1 GTIN

1.1.1 Allocation of GS1 Company Prefix

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. Since then, 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. GS1 company prefix are allocated to 121,851 companies as of March 2011. These registered companies include manufacturers of consumer products such as foods, sundry goods, apparel and textiles, and domestic electrical appliances, as well as utility companies engaged in supplying electricity, gas, water, and telecommunication services (see 1.4) and companies/ individuals who sell their products online (see 1.1.3).
Registration of the company prefix needs to be renewed every three years.

1.1.2 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.

Fig. 1.1.2-1 GEPIR Search Result Example Screen

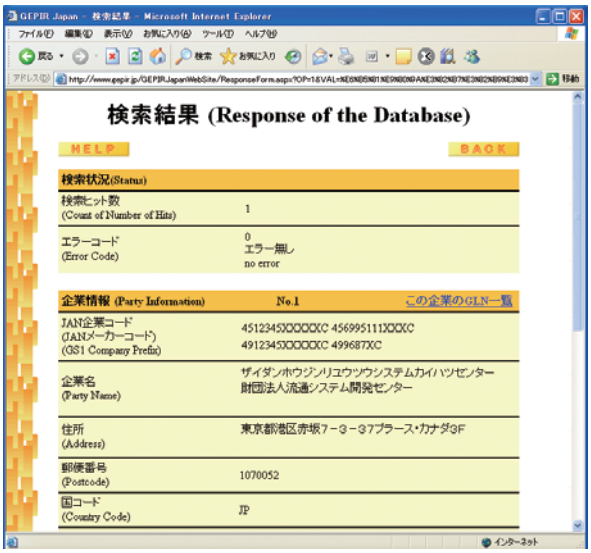
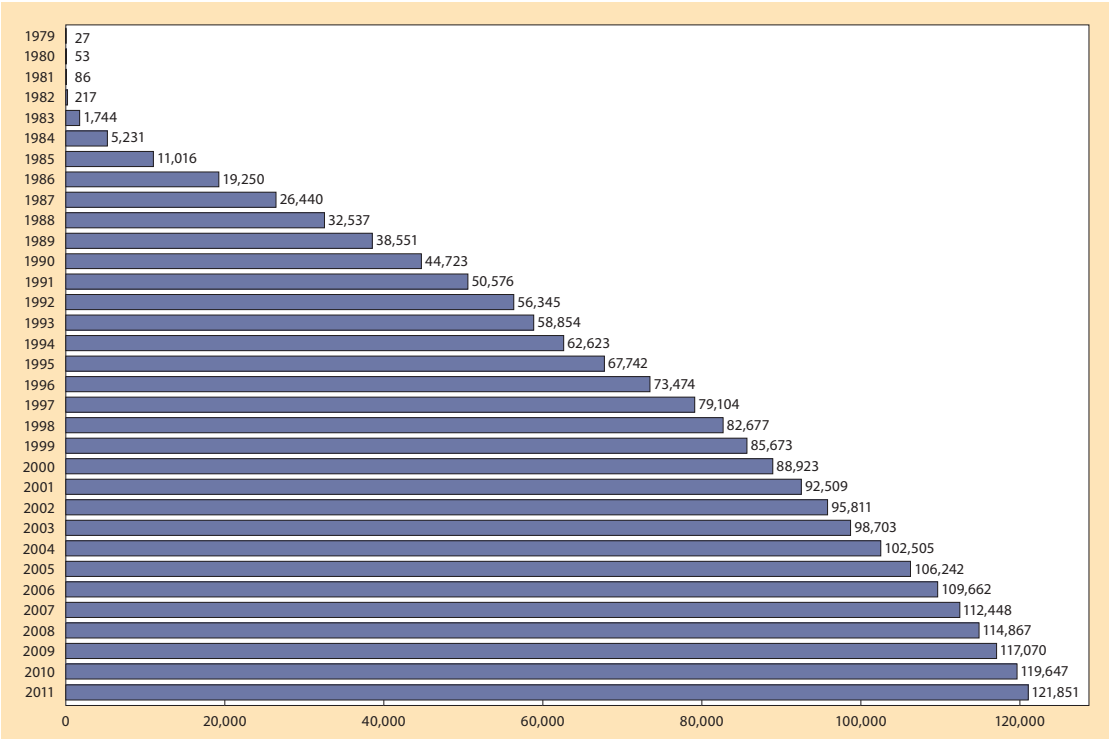


Fig. 1.1.1-1 Company Prefix allocation



1.1.3 GTIN application to online sales

GTIN is being used not only for products sold in brick-and-mortar stores but also for those sold on the Internet, including both physical products and downloadable digital products.

1.1.3.1 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 ranked second after food in 2006.

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 cellular phones. It is expected that online music distribution will continue to spread in Japan in the years ahead.

At present, Apple Inc. is the only confirmed user of GTIN for music distribution. GS1 Japan will continue to monitor the potential of GTIN use in this field.

1.1.3.2 Use of GTIN by Amazon. co. jp®

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

GTIN used in the "Amazon Advantage Program"

① 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.

② As an Advantage Program user, GS1 Japan has been selling some of its GS1 standard publications since 2007.

③ 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 encoding 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. 1.1.3.1-1 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 fulfillment 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 2011, many new registrants of the GS1 Company Prefix 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.

Search function using GTIN and cell phones

Amazon introduced a new 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. Because cell 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. 1.1.3.2-1 GS1 Japan Publications available at Amazon. co. jp®

Fig. 1.1.3.2-2 Scanning GTIN or ISBN using cell phones with camera

1.1.4 GTIN Sunrise 2010 : "Adoption of GTIN"

GS1 Japan has devoted introducing and educating adoption of GTIN for our user companies.
For instance, in the past, most companies in Japan had adopted the 16-digit local case code for outer cases approved by the EAN International for domestic-only distribution. Upon global strategy of using GTIN, GS1 Japan decided to strictly observe the GTIN allocation rules and introduce GTIN-14 for distribution by the GTIN Sunrise 2010 program. The following were the three main goals to be attained:

(1) Migrate from 16-digit local case code to GTIN-14.
(2) For some types of products, the GTIN-13 for the item contained in the case had been shown on their outer case. In this case, use GTIN-14.
(3) Some companies had used the same GTIN for products of decreased quantity (e.g., from 100 g to 85 g). In this case, educate the companies to use different GTINs for different product quantities.

Preparing to adopt GTIN, GS1 Japan created a consultative committee for identifying problems relating to the introduction and for discussing measures to cope with these problems to ensure smooth and efficient GTIN adoption. The committee was composed of members representing various stakeholders in the supply chain, i.e., manufacturers, wholesalers and retailers. After examining and having adequate dis-

cussions about the state of distribution in Japan, the committee drew up the "Guidelines for the Adoption of the GTIN" and the "Roadmap for the Introduction of the GTIN". In March 2005, GS1 Japan published these guidelines and roadmap and started full-scale efforts campaign for "adoption of GTIN.

With the cooperation of various stakeholders in the supply chain, information about adopting the GTIN was provided through briefings held for the member companies of distribution-related associations and organizations, and through various media. In addition, questionnaire surveys on the state of the adoption of the GTIN were conducted for individual companies, too, to provide them with related information and publicize and encourage wider adoption of the GTIN among them. As a result, the term "GTIN" came to be widely known in Japan's retail industry.

In March 2007, a campaign was started aimed at encouraging companies to observe the allocation rules closely, and individual businesses took steps to follow the rules.

Regarding changing 16-digit local case code to GTIN-14, which was a unique issue associated with the GTIN's introduction in Japan, the deadline was established to complete the migration by the end of March 2010. Public relations activities for the change were carried out, including, direct notices from GS1 Japan to the manufacturers of the products for which the GS1 Company Prefix was assigned well as campaign materials from wholesalers.

At present, awareness of the GTIN-14 has grown greatly in the distribution industry. With the exception of certain products with slow turnovers for which there remain some cardboard cases on which 16-digit local case code is printed, change to GTIN-14 has generally been going well.

1.2 Other Identification Numbers

1.2.1 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 the Japan Magazine Publishers' Association 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 "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. 1.2.1-1 Code Structure for Periodical Publications (magazines, newspapers, etc)

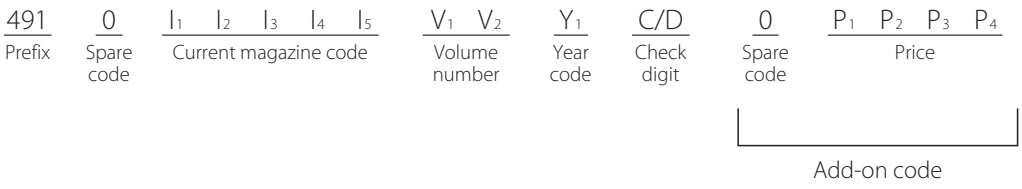
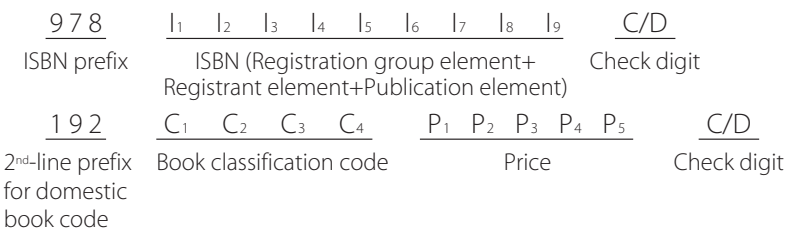


Fig. 1.2.1-2 Code Structure for Books

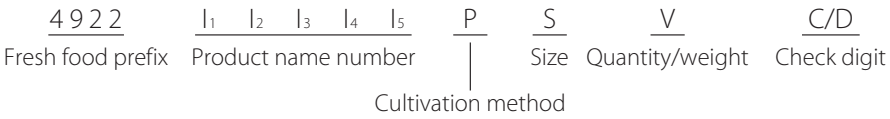


1.2.2 Coding for Fresh Food

In Japan, many agricultural cooperatives (approx. 800) 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.

Fig. 1.2.2-1 Fresh Food identification code structure



1.3 GLN

GS1 Japan has been promoting the use of GLN as a location code in B-to-B commerce. In Japan, there are currently four GLN numbering structures as shown in the table below. Companies assigned a 7- or 9-digit GS1 Company Prefix for product identification are able to generate GLNs using this prefix.

In addition, GS1 Japan provides information about GS1 Company Prefix holders via GEPIR. To further promote and encourage the wider use of GLN, we will also operate the GLN database system on our ↗ GEPIR website for registering and searching for individual location information.

At present GLN is being used to identify companies and places of business mainly in the e-marketplaces of department stores and in the EDI between the Japanese Consumers' Co-operative Union and its suppliers. In addition, we have recommended the use of GLN to the companies adopting the Ryutsu BMS, new EDI standard (See 2 for details).

Table 1.3-1 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

1.4 Billing System Using GS1-128

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 8 trillion yen (US$ 12 billion) / year in 2008. In 2011, 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. 1.4-1 Sample Payment Slip

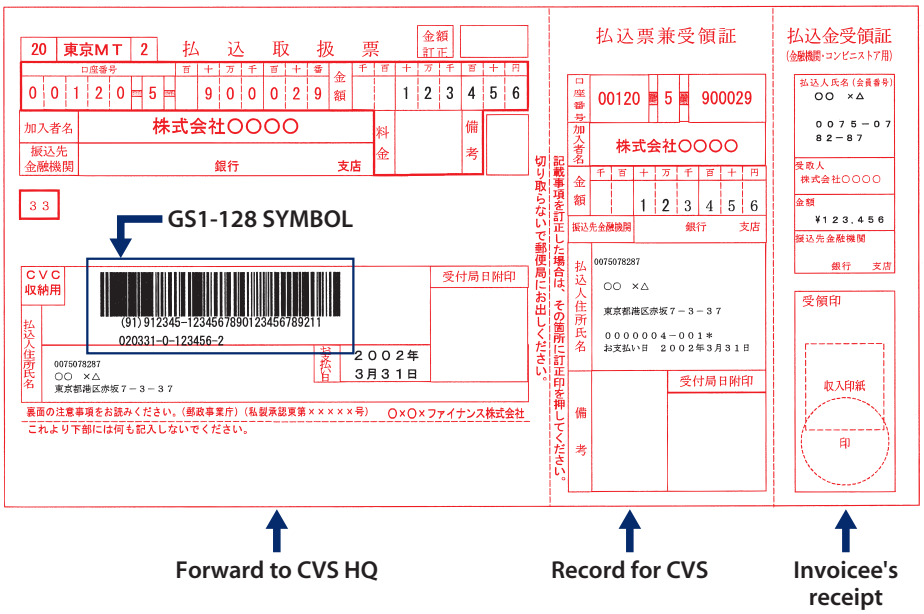


Fig. 1.4-2 Code Structure (44 digits) for Payment Slip

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

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

1.5 Food Traceability

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 two solutions using GS1 system: beef traceability and raw material identification used for processed food production quality control and traceability.

1.5.1 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 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 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.

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. 1.5.1-3) 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.

Fig. 1.5.1-1 Japanese beef traceability System

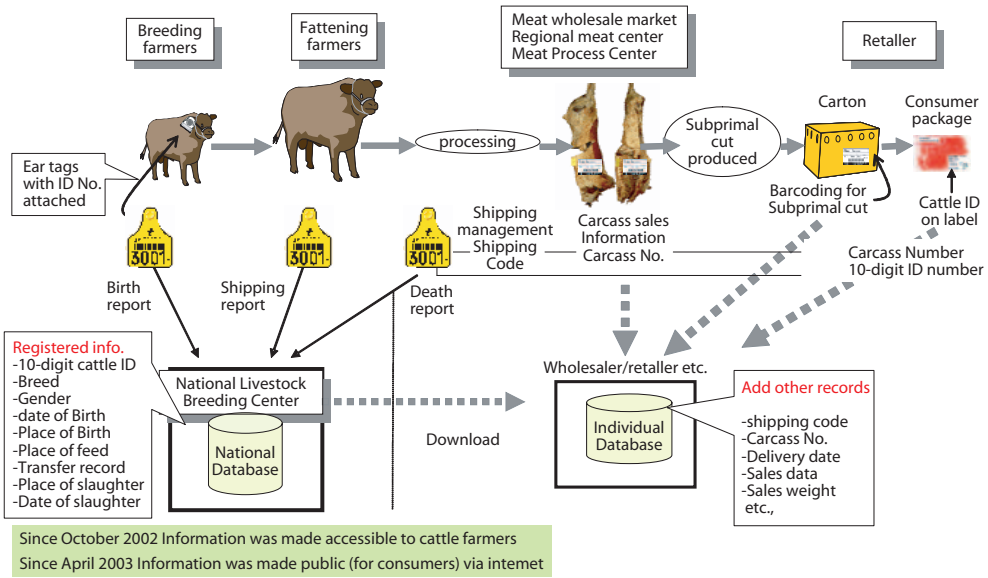
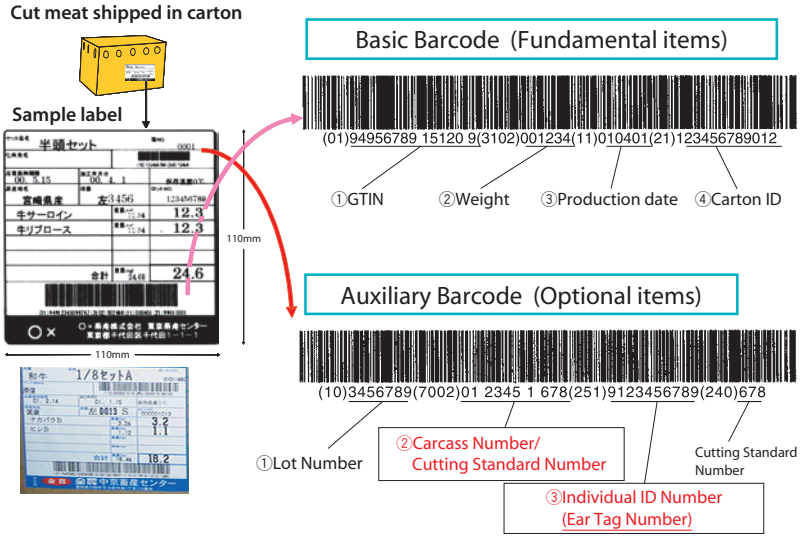


Fig. 1.5.1-2 Tag

Fig. 1.5.1-3 Standard Physical Distribution Barcode Label System for Meat



1.5.2 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.

1.5.3 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.

1.5.3.1 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 identification number, manufactured date, expiry date, lot number, etc. are encoded using AI. When combining materials, workers can prevent raw material combination errors and the use of expired raw materials by scanning this barcode with a hand scanner. Storing work records scanned with a hand scanner enables traceability. In addition, since actual inventories including the expiry date, lot number, etc. can be identified using the data, it is possible to achieve proper inventory levels and reduce costs.

Fig. 1.5.3.1-2 Encoded Information

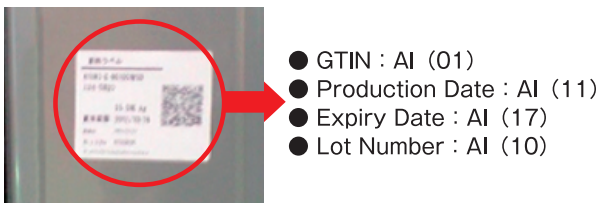
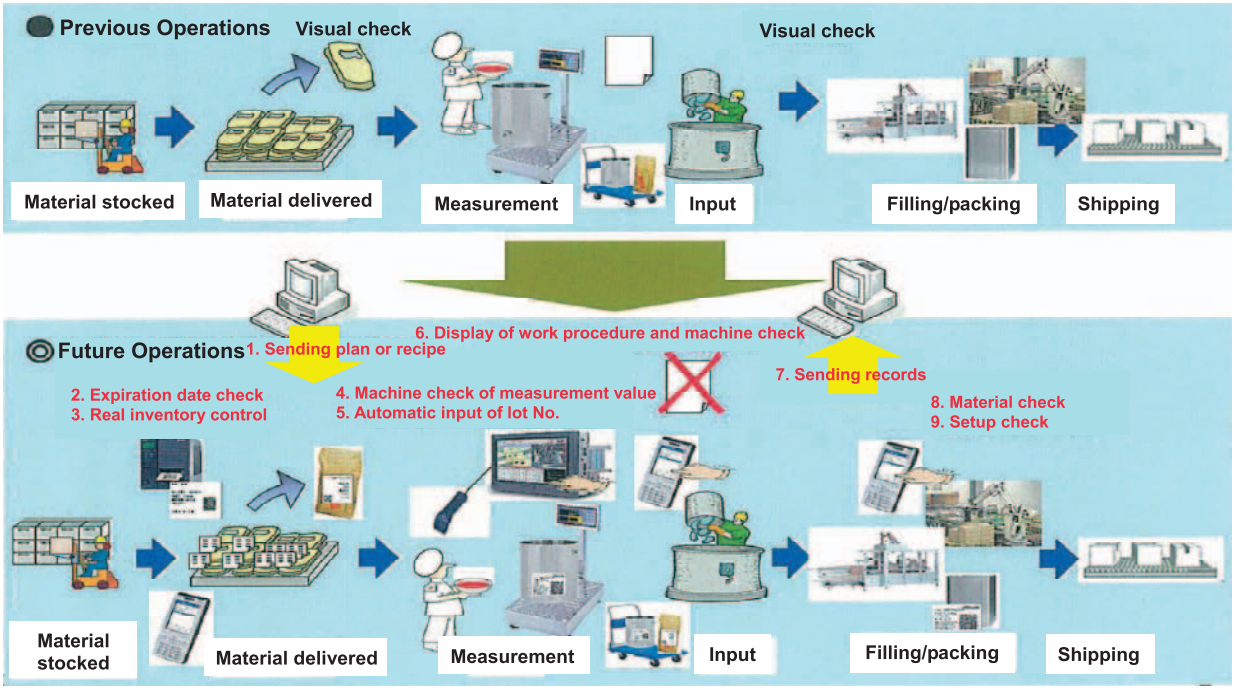


Fig. 1.5.3.1-1 Operation changes



1.5.3.2 Adoption in the Supply Chain Upstream

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, 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.

1.6 GS1 DataBar

Since the 2006 GS1 DataBar Adoption Plan Announcement, GS1 Japan has been promoting use of the GS1 DataBar in the Japanese market. This symbol has been attracting attention because of its capability to carry additional data in addition to product identification. There is still much to be done for nation-wide readiness because of various challenges, thus continued efforts and communication with industry will be necessary.

GS1 Japan has 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.

Since summer 2010, a local retailer started to use the GS1 DataBar Expanded to encode the sell-by-date on meat packages. GS1 Japan is planning to produce video showcasing this application so that we can use it in many different training and promotional activities.

1.6.1 Expectations and Challenges in Japan

The GS1 DataBar is perceived as a new tool that will help improve product management especially in the food chain industry. The ability of the GS1 DataBar to carry additional data other than GTIN has been receiving much attention.

On the other hand, the symbol's ability to enable unique global identification of products such as fresh produce or variable measure fresh food is appreciated less in Japan than in other regions. Japan's domestic fresh food supply chain and its business practices are complex, and this poses an obstacle to immediate migration from the restricted circulation number (RCN) to GTIN on fresh produce. The large number of small growers and Japan's public market auction system for fresh produce and seafood make source-identification seem less valuable or a less pressing issue.

The pace of readiness and replacement by those on the accepting side is another challenge. The large number of small and medium retailers and wholesalers makes education and promotion an important task. Even after such businesses are won over, smaller concerns tend to use their equipment longer and do not rush to replace it.

Promoting the value of using the GS1 Application Identifier

GS1 Japan is focusing 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

Fig. 1.6.1-1 GS1 DataBar Guideline
GS1 DataBar family symbols for retail Point of Sale

Fig. 1.6.2-1 Meat packages with sell-by-date. Automatically discounted at POS per remaining days

of the data are only for in-store use.
Retailers in Japan are currently handling additional data at point-of-sale such as price mark-downs or sell-by-dates. But the data format and the data carrier are not standardized. Typically the data carriers used are Code-128 without the GS1 Application Identifier or second EAN-13 symbols 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 data strings and in its possibility for expanded data as well as use in open supply chains.

1.6.2 New Use Case of Best-Before Dates

A small regional retailer started to use the GS1 DataBar in summer 2010. The store encodes best-before dates in addition to product identification for meat packed in its own premises. The symbol is used for two purposes. One is to alert if a package past the sell-by-date is brought to POS. The other is to automatically discount the package at the point of sale by looking at the sell-by-date in the barcode and calculating the remaining number of days at the point of sale. It is important for retailers to make clear to shoppers which packages are discounted and how much the discounted price would be. The retailer puts up signs showing the different price mark-down rates per different sell-by-dates on the label (Fig. 1.6.2-1). This use is advantageous in that it can reduce re-labeling even after the mark-down percentage is changed and thus helps reduce label consumption.

1.6.3 Promoting the guideline and driving broader awareness

In 2011, GS1 Japan will continue its efforts to reach small and medium sized retailers to promote the use of these symbols. We will also enhance our communications with hardware and software service providers to educate them on the benefits of introducing the GS1 DataBar for their customers. We will also work with industry on new business cases besides sell-by-dates or automatic markdowns, such as sales of variable measure products, in order to demonstrate another potential benefit of the GS1 DataBar in Japan.

1.7 QR code

QR code is pervasively used in Japan. It is regarded as the “Mobile barcode” because of the wide use in mobile application. It is also associated with traceability because of various use cases.

1.7.1 QR code introduction

QR codes are widely used in Japan and throughout Asia. It was invented in 1994 by Denso (now Denso Wave), one of Toyota Motor Corporation's group companies. It was approved as an ISO international standard symbol (ISO/IEC 18004) in June 2000. This 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" 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. More than 90% mobile phones in Japan feature a camera with software that can read and decode information contained in a QR code, which has literally made the symbol ubiquitous in Japanese daily life. Now it is almost the norm for mobile phones to also have software that generates QR codes for any given data. QR

Fig. 1.7-1 QR Code on a Retailer's Private Brand banana and National Brand Potato Chips package

Fig. 1.7-2 QR Code for train ticket combined with mobile phone

codes are not only visible everywhere and every day in Japan, but they are also scanned (and sometimes generated) by consumers. (see 4.3 for Mobile Applications).

The use of QR codes in the mobile industry is not limited to carrying mobile URLs. QR codes also carry a variety of data including information on tickets, payments, and coupons. Such uses are rapidly increasing. Japan's major airline carriers are using QR codes for encoding boarding ticket information. Some railway companies and many on-line ticket service providers are using QR codes for tickets and admission tokens. There are retailers and food service companies who encode mobile coupon data in QR codes. In such cases the QR codes are either printed on paper or displayed on a customer's mobile phone screen are read with image readers. The use of QR codes will only increase in the future steadily, if not phenomenally.

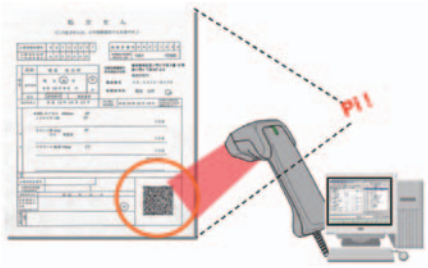
Another important use of QR codes is for traceability in food and other product supply chains. An increasing number of upstream suppliers of processed food use QR codes by encoding GS1 Data defined by Application Identifier standards (see 1.5.2 and 1.7.2). Government organizations recommending traceability acknowledge the QR code as an optional data carrier for implementing a traceability system. QR codes are typically used in labels too small to carry GS1-128. The industry guideline for surgical steel instruments allows QR code as a standard symbol together with GS1 DataMatrix to carry GTIN and serial number.

The GS1 General Assembly in May 2010 stated that QR code will be considered as an equal choice for 2D symbols in B2C transactions or any new applications using 2D.

1.7.2 Various Applications of QR codes

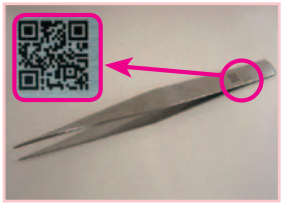
QR codes are presently finding a wide range of applications in various industries.

(1) Prescription data for dispensing pharmacies



A new service has started in which prescription data is encoded into QR codes and printed on prescriptions. The specifications for recording the data have been standardized by the Japanese Association of Healthcare Information System Industry (JAHIS). Pharmacy users read prescription data with a scanner, which enters patient and prescription data quickly and accurately into a computer, preventing input errors and alterations of prescriptions. Because the service reduces the time required for data input, the waiting time is shorter for patients and also allows pharmacists to spend more time giving instructions on dosage and administration. The encoded data include information on the medical institution, diagnosis and treatment department, physician's name, patient's name, health insurance information, and drug information. The encoded information complies with the data exchange standard of Health Level 7 (HL7) with which GS1 has concluded a Memorandum of Understanding for collaboration.

(2) Standardization at the Japan Association of Medical Equipment Industries



GTIN and serial numbers are coded into QR codes and directly marked on steel surgical instruments. (For more details, see 4.1.2.3)

(3) Test System for Blood Specimens

Medical laboratories analyze and test biological specimens such as blood as commissioned by medical institutions. These specimens must be accurately managed and identified individually because a great number of specimens are handled every day for individual hospitals, test types, and test times.
At some laboratories QR code labels are automatically printed and attached by labeling equipment. The encoded data include the acceptance date, medical institution name (in Kanji), analysis and test item codes, test site code, and identification number.

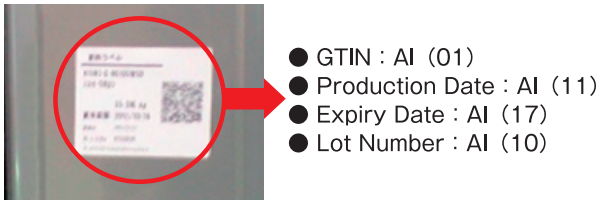
(4) Sales Management of Eyeglasses and Contact Lenses

QR codes are used to manage the sales of contact lenses and eyeglasses. For contact lenses, the product code, product name, power, base curve, and other information are encoded into a QR code about 8 mm square. The code is printed on the lens container, and the information is used for point-of-sales or inventory management.

(5) Visitor Management System

At various events such as exhibitions, seminars and receptions QR codes on the ID badges of visitors or event staff are scanned as individuals are entering and exiting the venue. The information is used for various purposes such as on-site management of security, marketing, and customer relations. For example, QR codes were used at the Expo 2005 Aichi Japan to control staff and vehicle entry.

(6) Food safety



GTIN, date of manufacture, expiration date and lot number are encoded into QR codes and used for food safety.

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 tasks other than ordering, and in the 2000s, based on Efficient Consumer Response (ECR) and Quick Response (QR) procedures, 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 and was designated in 1982 by the Ministry of International Trade and Industry (present Ministry of Economy, Trade and Industry, known as 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, billing 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 attributes due to the fixed-length formatting
- 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 distribution 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 (*2) Business Message Standards (known as Ryutsu BMS) were created as a new EDI standard. The Ryutsu BMS is now being increasingly adopted throughout the retail industry, including supermarkets.

2.1.2 Outline of the Ryutsu BMS

The Ryutsu BMS defines the followings:

Communication infrastructure

Assuming that the Internet is used for communication, 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 steps to ensure security, a concern when using the Internet, were prepared, and the use of three certificate authorities that have followed the guidelines has been recommended.

Standard Messages

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

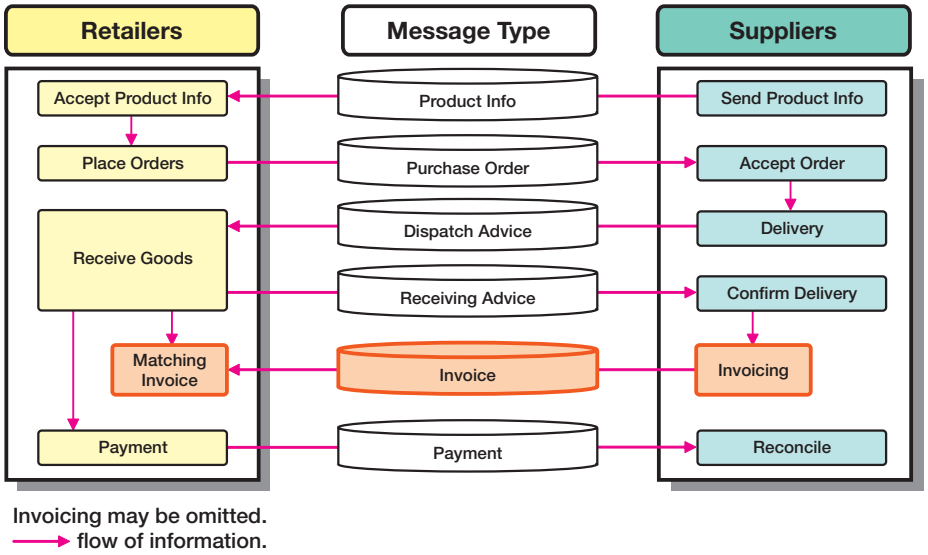
Basic messages: Intended for use at supermarkets, drugstores, do-it-yourself (DIY) stores, etc., 26 basic messages were prepared on the basis of an ordering business model, which starts from order placement by the retailer and continues to the shipment and receipt of the placed order. In 2010, retailers and the apparel industry worked together to develop peer-to-

*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 Kanji and images cannot be transmitted. DDX circuits are packet communication services using telephone circuits provided by NTT.

*2 Ryutsu
Ryutsu is the Japanese equivalent of a supply and demand chain, and 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 over a TCP/IP network. Using the international SOAP-RPC standard, this protocol features functions equivalent to those of the J Protocol. The JX Protocol has become the standard communications protocol for exchanging EDI messages between a client and a server in the Ryutsu BMS.

Fig. 2.1.2.2-1 Typical Turnaround Business Processes and Ryutsu BMS Messages between Retailers and Suppliers



peer product information data messages.

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

2.1.3 Users' commitment to Ryutsu BMS

According to a survey conducted by GS1 Japan in July 2011, 68 retailers and 109 wholesalers or manufacturers have already adopted the Ryutsu BMS. The survey results by business category and product are described in Fig. 2.1.3-1.

Fig. 2.1.3-1 Number of companies the implementing Ryutsu BMS As of July 1, 2011

Retailers

Business Category	Adopted	Plan to adopt	Subtotal
1. Supermarket	58	14	72
2. Department Store	3	6	9
3. Drugstore	1	3	4
4. DIY Store	3	1	4
5. Cooperative Store	3		3
Total	**68**	**24**	**92**

Wholesalers or Manufacturers

Business Category	Adopted	Plan to adopt	Subtotal
1. Food, Beverage Wholesaler	47		47
2. Confectionery Wholesaler	12	5	17
3. Commodities, Cosmetics Wholesaler	9	5	14
4. Drug Wholesaler	4	2	6
5. Apparel, Shoes Wholesaler or Manufacturer	11	1	12
6. Food Manufacturer	19	2	21
7. Household Goods Wholesaler or Manufacturer	3	2	5
8. Packaging Material Wholesaler or Manufacturer	4	5	9
Total	**109**	**22**	**131**

2.1.4 Ryutsu BMS Users' cases

Aeon Group

AEON Group is one of Japan's largest retail groups, which operates various businesses such as supermarkets, drugstores, and specialty stores with annual group sales of 5,096.5 billion yen (Fiscal Year ended February 2011).

AEON is a Ryutsu BMS pioneer. AEON began participating in the next-generation EDI initiatives early on and took an active part in the establishment of the Ryutsu BMS and pilots.

As of June 2011, AEON is using the Ryutsu BMS with 375 suppliers and testing it with 50 other suppliers. However, its introduction rate is currently less than 20% of all of AEON's businesses. AEON is to complete switching from the existing JCA Protocol using telephone lines to the Ryutsu BMS by the end of 2012.

Eight messages;" Order, Shipment Notification, Package Shipment Notification, Receiving Notification, Return Notification, Invoice, Payment, and Price Tag" are already being used at 17 companies of the AEON Group, and preparation for using "Order Plan" is currently in process. As AEON Group consists of multiple companies and its mergers are accompanied by system integration, it is very effective for the entire Group to be able to use the Ryutsu BMS.

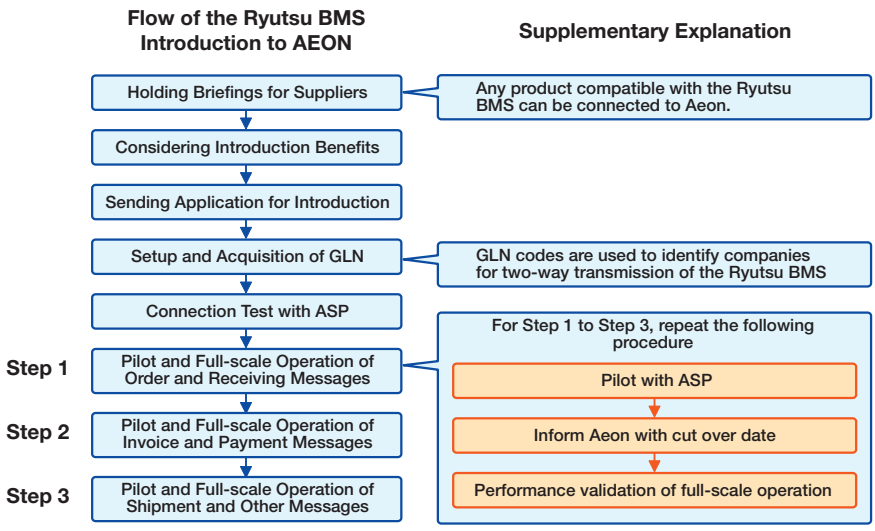
In addition, the Internet can transmit Japanese Kanji characters, which could not be achieved using conventional methods, and enables new data services such as image information in the future. On that premise, AEON positions the Ryutsu BMS as a key element in the group's infrastructure that is indispensable for establishing new business models and creating business innovations. AEON thinks that widespread use of the standards reduces operating costs, which leads to improving customer service, creating new value, and enhancing in-store and after-sale services.

Other benefits of the introduction are a reduction of processing time (reduced 94%) and a reduction of the preparation period for EDI with new suppliers. Suppliers will have more time for their operations with the reduced time of data communication, and picking accuracy is expected to improve. Since the Ryutsu BMS comprises standards, systems can be introduced at low cost and the preparation period is reduced when data exchange is started with other retailers using the Ryutsu BMS. As the data is linked from Order to Payment, data accuracy is improved and matching operations are reduced at both AEON and suppliers.

In the future, AEON will further encourage suppliers to adopt the Ryutsu BMS in cooperation with Merchandising Division. On May 19, top management at 49 companies in the consumer products industry made a commitment, their "Declaration of Adoption of the Ryutsu BMS," in the Collaborative Council of Manufacturers, Wholesalers, and Retailers. Ten companies of AEON Group participate in the Council and actively promote the wider use of the industry-standard online system. At the same time, the systems are to be replaced before the aging JCA Protocol systems incur a greater risk of not being able to send order data.

To expedite switching over from JCA protocol to the Ryutsu BMS, AEON is making a lot of effort to educate the group companies and the suppliers. Starting with briefings for suppliers at AEON's head office on July 19, 2011, 11 briefings in 8 locations will be held throughout Japan from Hokkaido to Okinawa up to November. In parallel, briefings on the Ryutsu BMS

Fig. 2.1.4-1 AEON Ryutsu BMS introduction procedure



have been given via teleconference to the head offices and local merchandising divisions of 25 companies in AEON Group that have introduced or plan to adopt the Ryutsu BMS.
The briefings for suppliers are held in cooperation with the Supply Chain Standards Management & Promotion Council in the Distribution Systems Research Institute where the head office of GS1 Japan is located. The Council gives an overview in the first half of the briefing, and AEON explains the introduction schedule and procedures, such as points to note in switching over from the JCA Protocol, in the second half. The figure is one of the materials used at the briefing for suppliers that explains the procedures to introduce Ryutsu BMS messages from Order to Payment in a short time. The use of Global Location Numbers (GLN) are recommended in the Ryutsu BMS to make the destination of the communication unique. With the participation of the Council, introduction of the Ryutsu BMS is being fully promoted not only by AEON, but also across the distribution industry.

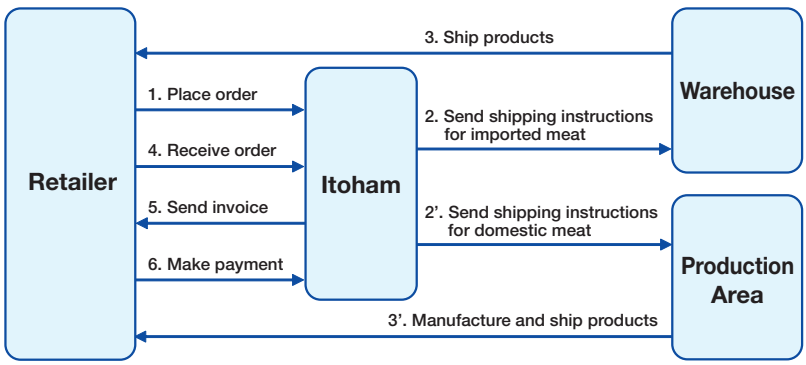
Itoham Foods Inc.

Itoham Foods Inc. is a major meat and processed meat products manufacturer founded in 1928. The combined sales of its Ham and Sausage Division, Fresh Meat Division, and Processed Foods Division are 455,989 million yen (Fiscal Year ended March 2011).
The meat industry including Itoham has always had a high level of awareness of standardization and worked toward the standardization of GS1-128 meet logistics labels and the traceability of domestic beef cattle. The industry has actively participated in the standardization of the Ryutsu BMS. Ryutsu BMS Ver. 1.0 was released for processed foods and other consumer products in April 2007, and the target products were expanded to fresh foods such as meat as a result of continued discussions by the task force of the meat industry established in June 2007. In December 2007, four companies in the industry including Itoham conducted pilots. Immediately following the success of these pilots, Itoham started full-scale operation of the Ryutsu BMS. Since then, Itoham has steadily increased the number of its retailers that have adopted the Ryutsu BMS to 9 companies in 2009, then to 14 companies in 2010, and currently to about 30 companies.
The effects of the adoption of the Ryutsu BMS are as follows.

- Man-hours for development and maintenance dramatically decreased because the maintenance of individual retailer's programs is not required.
- Since data is linked from Order to Payment, data matching can be done easily and accurately.
- Communication costs decreased with the reduction of communication time.

Fresh foods such as meat have particular aspects in that these products cannot be received as ordered, or products are determined before shipment, because the production capacity of each production area is limited. This situation occurs when retailers' orders exceed their limits.
Therefore, if the production area is specified when accepting orders, depending on the number of orders, not all products can be shipped and delivered as ordered. When Itoham accepts orders from retailers, imported meat products are shipped from warehouses, but for domestic meat orders, Itoham gives production instructions to a production area and products are then shipped from that production area. There are cases in which not all products can be prepared at the production area specified by a retailer. In such cases, Itoham makes an adjustment with the retailer and changes the quantity or ships products from different production areas. As direct delivery from production areas has been recently increasing and delivery companies act as go-betweens, Itoham expects that if these companies also adopted the Ryutsu BMS, the meat supply chain would become more visible and efficient.

Fig. 2.1.4-2 Basic Buisiness Processes in Meat Industry



3. EPC/RFID

3.1 EPCglobal Japan

The movement to utilize RFID as a next generation data carrier within 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 cooperated to advance research on RFID. Those efforts then led to the founding of a new organization combining RFID tags and the internet technology in 2003 for the purpose of standardizing and promoting EPC/RFID systems. This organization is called EPCglobal and is part of the GS1.

Since EPCglobal Japan was established as a part of GS1 Japan in 2004, we have been participating in EPCglobal standardization activities and promoting EPCglobal standards in this nation. EPCglobal Japan provides a wide range of services such as:

- Supporting introduction of the EPCglobal Network System.
- Holding regular EPC/RFID Introductory courses including providing a UHF Gen2 demo system for users.
- Holding EPC/RFID seminars in public venues, and
- Allocating and registering EPC Manager Numbers to subscribers.

3.1.1 Recent Activities of EPCglobal Japan

EPCglobal Japan has been conducting the following activities:

- Participating in various EPCglobal meetings, such as GS1 Industry and Standards events.
- Holding seminars aimed at promoting the EPCglobal Network System and providing information about the EPC/RFID system and RFID business cases.
- Establishing RFID study committees for industries interested in implementing RFID.
- Holding regular meetings with EPCglobal Japan subscribers to provide information about the recent activities of EPCglobal and a forum at which subscribers can exchange opinions that can be reflected into EPCglobal activities, and
- Developing a promotional video to introduce best practices in Japan and GS1/EPCglobal standards.

3.2 RFID initiatives in Japan

3.2.1 Japan's Initiatives for Transport and Logistics Supply Chain Visibility

Many Japanese manufacturers have offshore production sites and trade around the world. However, since they generally consign the cargo shipping associated with production and sales to other companies, it has been difficult for them to effectively manage the global supply chain. To optimize the whole supply chain, these manufacturers need to understand the transport process in real time and take necessary measures in a timely manner, but a visibility platform to share cargo movement information among global supply chain parties has not yet been established. Therefore, building such a visibility platform to capture the movement of cargo around the world using GS1 EPCglobal standards is under consideration.

The movement to make the whole supply chain process visible using automatic identification technologies such as RFID has been accelerating among Japanese manufacturers for several years. The Ministry of Economy, Trade and Industry (METI) has been con-

Fig 3.1.1-1 EPCglobal Japan study committee and seminar

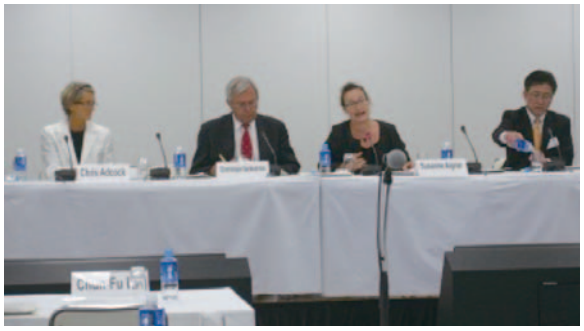
ducting the Study Committee for T&L Supply Chain Visibility for which GS1 Japan is the secretariat. The Study Committee consists of METI, the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), industry associations, academia and companies from the consumer electronics industry and transport & logistics industry. EPC Information Services (EPCIS) has been one of main subjects of study in the committee because it is considered to be the most effective tool for supply chain visibility. The Study Committee is also considering adopting EPCIS in a port information system currently under development and will continue further discussions on EPCIS.

3.2.2 Cooperation with APEC

When building a platform to share cargo movement information, it is crucial to adopt technologies based on international standards and obtain the agreement of the countries and industries involved in its operation. METI organized a Supply Chain Visibility workshop at the APEC meeting in September 2010 in Sendai, Japan. At the beginning of this workshop, METI discussed the importance and necessity of supply chain visibility, and then the various industries, governments, and international standards organizations reported on their perspectives and efforts. From the industries, global companies such as Canon, Toshiba, Oracle, IBM, DHL, and NYK Line expressed their own corporate expectations for supply chain visibility. In addition to reports by the governments of Japan, China, Korea, Peru, Taiwan, Hong Kong, and Russia, the European Commission (EC) introduced their efforts toward supply chain visibility. Regarding the progress of international standards organizations, the World Customs Organization (WCO), the United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT), and GS1 also explained the related trends of standardization. It was a highly significant workshop that deepened participants' understanding of supply chain visibility issues.

Based on the outcome of this workshop, it was clearly noted in the Joint Statement of the APEC Ministerial Meeting that APEC would continue to consider supply chain visibility at its meetings. As such, the movement toward supply chain visibility is expected to accelerate in the APEC economies. At the meeting, many countries and regions announced that they are considering the establishment of information platforms using EPCIS of GS1/EPCglobal. Since the sharing of cargo movement information using EPCIS will be achieved in the near future within the APEC region, then it will be again discussed at the next APEC meeting in the U.S.

Fig 3.2.2.-1 APEC Supply Chain Visibility workshop in Sendai



3.2.3 Transport & Logistics Industry User Group

Since its establishment in 2005, Many Japanese companies took part in the Transportation & Logistics Services Industry Action Group (TLS IAG) of EPCglobal. These Japanese businesses have played active and leading roles in the TLS IAG by, for example, conducting a three-year pilot study on global logistics.

Fig 3.2.3-1 Pilots of Transport & Logistics Industry User Group

The study conducted with financial assistance from METI, found that not only UHF Gen 2 passive tags but also active tags would be effective for logistics purposes. The study also revealed that it was possible to identify freight and logistics equipment by RFID and to share that information among stakeholders using EPCIS. The standard specifications of GS1/EPCglobal were confirmed to be effective for supply chain visibility. Efforts have been made to develop standard specifications further using the knowledge obtained from the pilot study.

In 2010, the TLS IAG was merged with the GS1 Logistics Forum and newly inaugurated as the Transport & Logistics Industry User Group (T&L IUG). The T&L IUG will continue activities aimed at increasing the use of the GS1/EPCglobal standards specifications in the logistics industry.

3.3 Industry Business Cases

Several industries have started adoption and implementation of EPC/RFID systems such as apparel, gas, food, and book.

3.3.1 Apparel Industry: Item Level Tagging Use Case

In February 2010, a new apparel shop called I.T.'S. international opened in Harajuku, one of Tokyo's leading fashion districts. This shop was the first to install an item level EPC/RFID system in Japan's apparel industry. An EPC/RFID hangtag or a product label with encoded Serialized GTIN (SGTIN) data is attached to every single item in the shop and backroom inventory including jackets, skirts, belts and socks.

An EPC tag is integrated into its brand paper hangtag or label and attached to each finished product at the sewing factory. EPC tags are read at the distribution center during the shipping inspection. Bulk reading of EPC tags has made this inspection process easier than the conventional way that uses barcodes. After the inspection, an EPC tagged shipping label is attached to each carton case and the Serial Shipping Container Code (SSCC) is encoded.

At the shop, the receiving inspection is completed by just reading the carton tags because the carton SSCC is associated with SGTINs of the items in the box. The inspected products can be displayed in the shop soon after they arrive, so this system is expected to prevent lost sales opportunities.

The most significant benefit of adopting EPC/RFID is in the inventory process. In the Harajuku shop, it takes only 3 hours for one staff member to complete the reading of some 18,000 items. Therefore, it is becoming easier to accurately know the stock status nearly in real-time.

For faster checkout, RFID-enabled POS systems have been installed in the shop. With these POS systems, shop staffs do not have to scan each barcode on a sales item. RFID antennas are installed under the counter tops. When items are placed on the counter, the system automatically captures the product information and shows the total price instantly. The clerks are able to focus on customer service and to communicate with customers. With the EPC/RFID system, the shop can provide smoother and more enjoyable shopping experiences to customers.

As of May 2011, I.T.'S. international operates 7 RFID-enabled shops. The company is now planning to install new RFID applications, such as an RFID-based EAS system and intelligent fitting room.

Fig 3.3.1-1 I.T.'S. international Harajuku shop, EPC hangtag, and inventory-taking in the shop

3.3.2 Gas Industry: Activities of the Japan Industrial and Medical Gases Association

It is estimated that there are some 15 million gas cylinders in distribution in Japan. A variety of gases such as oxygen, hydrogen and CO2 are widely used in industry and there are also a huge number of high-pressure gas cylinders in use. There had been no standardized method of managing gas cylinders. Some companies managed them using internal barcode systems while other companies used numbers engraved on the cylinders. It had been difficult to determine the actual owner of a neglected cylinder because two thirds of the gas distributors had not adopted a barcode system. They just visually read the number engraved on a cylinder and copied it on a paper form. Neglected or missing high-pressure cylinders pose a very serious problem because of the risk of explosion due to corrosion.

The member companies of the Japan Industrial and Medical Gases Association (JIMGA) had tried to solve the problem using a barcode system, but it was not successful since there was no standardized barcode management method and no interoperability among the gas suppliers. In addition, barcode labels were not durable enough for business operations in such a harsh environment. JIMGA thus decided to use EPC/RFID for managing gas cylinders and developed several types of EPC/RFID tags to attach to various types of cylinders. The test of this EPC/RFID system was completed by spring of 2010 and the system has started to be implemented throughout Japan.

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 realize more efficient distribution of gas cylinders by managing them as assets.

About Japan Industrial and Medical Gases Association (JIMGA)

JIMGA strives to improve and rationalize the production, distribution, and use of industrial and medical gases as well as the production and marketing of facilities and equipment associated with medical gases and equipment associated with home therapy. Number of member companies: 1,200.

Fig 3.3.2-1 EPC/RFID operations at a gas cylinder filling station

3.3.3 Food Industry: Cage Trolley Management

The Cage Trolley Management System was developed by Kibun Trading Inc., a member company of 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 (-XXX), 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 allows 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.

3.3.4 Book Publishing Industry: Item Level Tagging Use Cases

In Japan's publishing industry, high return rate of books , which is estimated to be about 43%, has been a longstanding issue. In Japan'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 June 2011, Shogakukan attached UHF Gen2 tag labels to 13 titles with total 1,700,000 copies. Each copy is uniquely identified with RFID, so Shogakukan could try setting 2 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

Fig 3.3.3-1 EPC/RFID operations at a distribution center for refrigerated food

Cage Trolley

Cage Trolley name board

Fitting attachment for EPC tags

Reading EPC tags

Fig. 3.3.4-1 Tagged books and process of checking books returned from bookstores

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 amount of books that they ordered with the non-consignment option. In the current situation, the total amount of orders sometimes exceeds the amount 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. Shogakukan was satisfied with this result and it is planning further implementation in 2011.

Moves to introduce RFID tags have begun not only in publishing companies but also in bookstores.

Kinokuniya Co., a large chain of bookstores operating across Japan, on July 15, 2010 began attaching UHF Gen2 tags to the foreign publications it sells. Attaching tags to all of its stock of foreign publications would involve processing some 800,000 copies. The prices of foreign publications differ even for the same title because the exchange rate differs at the time the item is imported. In the past the International Standard Book Number (ISBN) of the publication was the only data they could use to identify publications and use for sales management. By utilizing electronic tags capable of identifying each copy, the company can now more accurately analyze its sales. Kinokuniya aims at increasing the efficiency of its inventory control, too.

Another large bookstore chain, Maruzen Bookstores Co., started tagging its stocks of foreign publications at its Maruzen Marunouchi Main Store on January 2011. The tagged publications amount to approximately 150,000 copies. Before implementing RFID, the company outsourced its inventory work because it took 20 persons 12 hours to do and had to be done outside store hours. With RFID, it takes 6 persons less than 5 hours, so the work can be completed by its own store staffs and it has led to a reduction in outsourcing costs. The tagged books are also staff-friendly. It was not easy for shop staff 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, staff can locate a given title because the reader beeps when it reads the designated book tag. The company is now piloting a solution for shoplifting prevention by combining RFID with an image recognition technique.

Fig 3.4-2 Reading EPC tags in the bookstore (Inventory-taking and checkout at POS)

4. Solutions

4.1 Healthcare

4.1.1 Pharmaceutical Products

4.1.1.1 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.

4.1.1.2 Over the Counter (OTC)

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

Fig. 4.1.1.1-1 GS1 Barcodes in Healthcare

*1 FPAMJ
Federation of Pharmaceutical Manufacturers' Association of Japan

4.1.2 Medical Devices

4.1.2.1 The guideline issued by MHLW

The Japan Federation of Medical Devices Associations (JFMDA) resolved to use the EAN/UPC and GS1-128 symbol in 1998, which was followed by the publication of the guideline in 1999 with the help of GS1 Japan. However, the use of these standards had been optional for each company.

In March 2003, MHLW published its "Vision for the Medical Device Industry." The accompanying "Action Plan" strongly encouraged the industry to promote the use of information technology systems to build a new product database and use bar codes to increase patient safety.

In 2004, for the purpose of inducing the implementation of the agreed-upon standard, MHLW started monitoring its 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 taking public comment procedure twice where the draft was modified accordingly, MHLW issued the barcode making guideline in March 2008.

4.1.2.2 Implementation of the Guideline

According to the survey conducted by MHLW in 2010, more than 70% of medical devices existing in Japan are registered in MEDIS-DC database and 88.8% are shipped with GS1-128 symbol labels as shown below.

4.1.2.3 Direct Marking for Surgical Instruments

Japan Association of Medical Equipment Industries (JAMEI) 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 has selected QR code in addition to DataMatrix as standard for 2D data carrier.

In July 2010 the GS1 Healthcare Japan (See 6.2) 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.

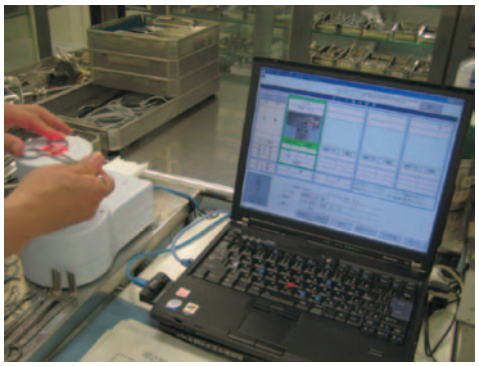
Table 4.1.2.2-1 MHLW Guideline for Barcoding Medical Devices

		package		Unit	
		outer	inner		Option (small size)
Symbol	GS1-128	○	○	○	
	ISO 2D Symbols				○
Indicator Digit		1 to 8		0	
Application Identifier		(01) (17) (10)or(21)		(01) (17) (10)or(21)	

Table 4.1.2.2-2 Barcoding Medical Devices in Japan (Results of the MHLW survey)

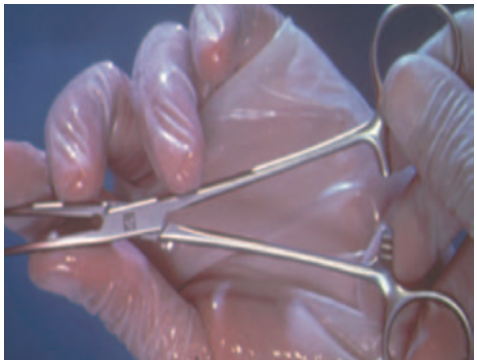
	As of 30 September 2010	As of 30 September 2009
Number of items with GTIN-13	96.1%	94.1%
Number of items registered to MEDIS-DC Database	70.3%	57.4%
Number of items GS1-128 barcoded	88.8%	80.8%
Number of individual package unit items GS1-128 barcoded	72.6%	65.1%

Fig. 4.1.2.3-1 Surgical Instrument with direct marking



Scannig Instruments

Data Matrix Scanner



Laser marked scissors

Data Matrix

4.2 Mobile Solutions

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

4.2.1 Smart ticket service using Security QR codes (SQRC)

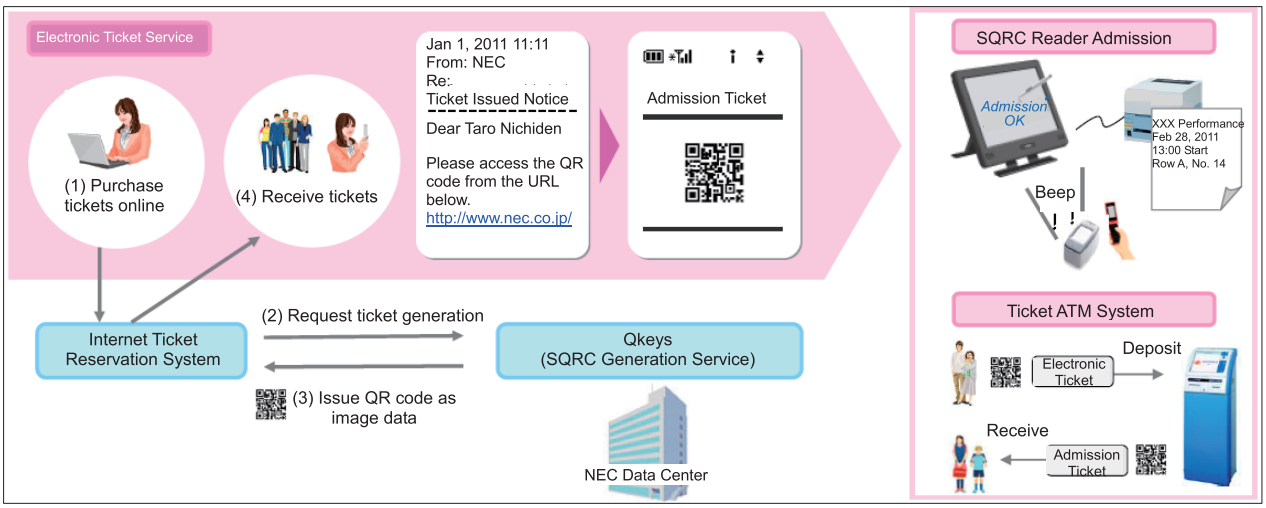
Shiki Theatre Company has nine theatres throughout Japan and stages about 3,000 performances per year including both overseas and original musicals.

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

Fig. 4.2-1 Smart Ticket usage image



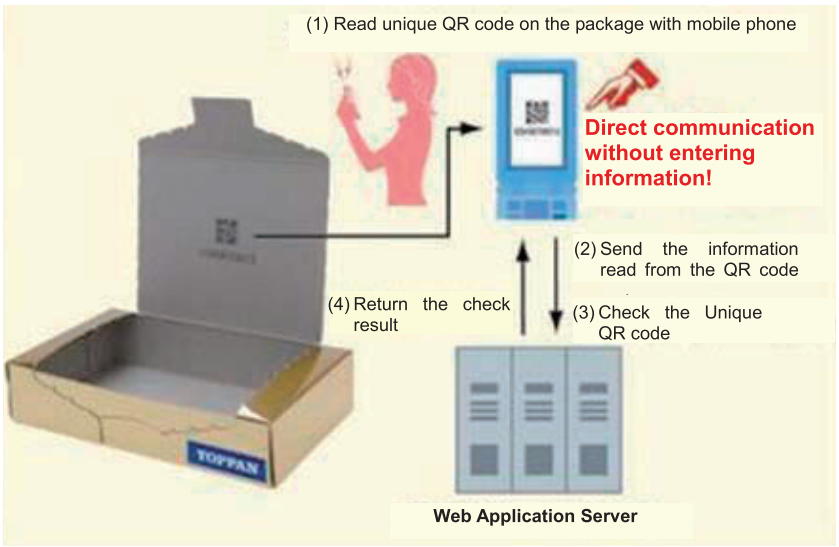
tickets on Shiki's online Ticket reservation website. When purchasing, they request to receive SQRC Tickets by mobile phone.
The SQRC Reader Admission System consisting of an SQRC reader, a screen, and a printer (Fig. 4.2-2) is installed in each theatre.
Audience are allowed admission after the QR Ticket 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 4.2-2 Admission system installed at the entrance of the theatre

4.2.2 Prize promotion using QR codes and mobile phones

The Unique QR code is a QR code encoding 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., and Ajinomoto Co., Inc.
When consumers read these Unique QR codes with their mobile phones, they can access the prize promotion website where their serial numbers are automatically entered in prize drawings. Consumers can easily participate in prize promotions without needing to manually enter the website URL and serial numbers.
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.

Fig. 4.2-3 Products using Unique QR codes (Left) Image of Unique QR codes usage (Right)



4.2.3 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 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.

4.2.4 iPhone applications in beauty and barber industry

The National & Barber Manufacturers'Association Japan (NBBA) has supported the development of mobile applications for smartphones, such as the iPhone, and started to distribute them for free on the Apple App Store to provide information to shops, stylists, and consumers. These applications have been developed in cooperation with content providers for smartphones.

Currently, four menu categories of information are available: magazines, haircut styles, videos, and product information.

Stylists are able to use these applications to exchange hair style images and communicate with other stylists. It has raised the awareness of users, beauty and barber shops through the introduction of information media such as magazines that are not readily available in Japan. The challenge is securing income sources to support operating costs.

4.2.5 Shopping district aiming to increase customers in mobile business

The Motosumi Oz Street Shopping District is located near Motosumiyoshi Station in the suburbs of Tokyo.

The Oz Family Club is an email newsletter providing information on child-care, local events, and shopping from the shopping district association. The newsletter had about 3,000 subscribers as of February 2011 and this has been the average number of registered subscribers.

Using the slogan, "Valuable and convenient information from your shopping district," the shopping district began soliciting new subscribers by offering the benefits of timely information.

As the number of subscribers to the Oz Family Club rises, some shops are seeing an increase in sales.

In 2010, a digital information board was installed in front of Motosumiyoshi Station that displays various information, such as about shops in the shopping district and child-care. (Fig. 4.2-7)

In addition, the digital information board has a FeliCa (*Osaifu-Keitai* : a contactless IC card technology developed by Sony) reader and writer from which users can receive shop information and coupons directly to

Fig. 4.2-4 Muse

Mobile phone with barcode reader

their mobile phones.
The shopping district has begun considering a more attractive mechanism with a view toward introducing a loyalty point card system using Twitter and Facebook.

In addition to its current activities, the shopping district plans to promote cooperative use of the email newsletter and digital information board through mobile phone media and provide new services.

Fig 4.2- 5 Main menu (Left) Introduction of magazines (Center) Image information (Right)

Fig 4.2-6 Email newsletter on the phone's screen

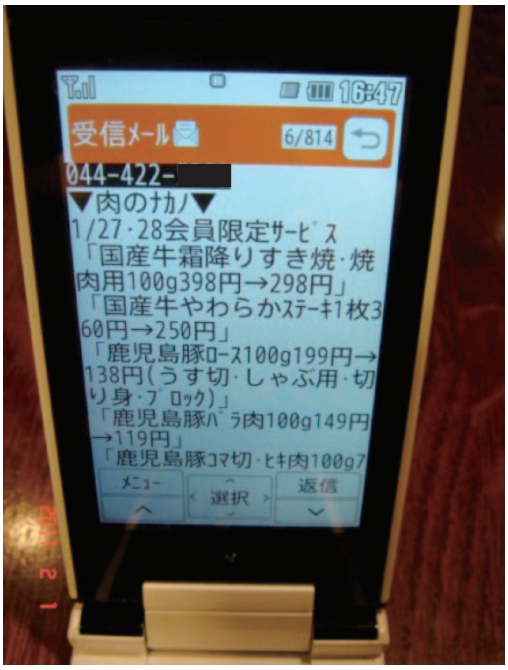


Fig 4.2-7 Digital information board installed in front of the station

5. Database Services

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

Since 1988, GS1 Japan 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 POS masters at retailers and EOS masters between wholesalers and retailers as part of the supply chain information infrastructure. The JICFS/IFDB database is recently being used for a variety of other purposes, including online shopping portals and for marketing research. Firms 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

Fig. 5.1-1 JICFS/IFDB System Flow

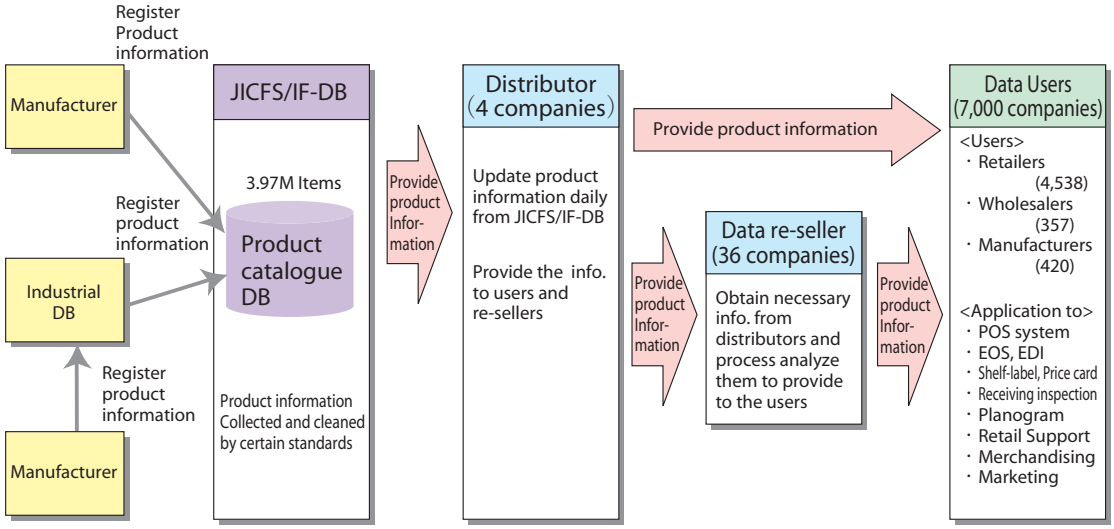


Table 5.1-1 JICFS/IFDB Number of Registered Items by Year (as of March 2011)

	2007	2008	2009	2010	2011
Food	749,757	819,305	841,245	947,898	1,043,430
Commodity	489,226	493,200	483,683	533,279	590,008
Recreation and Miscellaneous	194,781	229,594	240,320	277,535	334,197
Durable Goods	131,572	146,979	153,531	173,835	195,070
Apparel, Personal items & Sporting goods	131,001	145,917	150,814	167,611	183,405
Others	5,049	4,382	3,677	3,608	3,494
Active item Total	1,701,386	1,839,377	1,873,270	2,103,766	2,349,604
Inactive Data	2,777,762	2,958,804	3,104,154	3,104,154	3,104,154
Grand Total	4,479,148	4,798,181	4,977,424	5,207,920	5,453,758
Increase in number of items (year-on-year)	238,295	319,033	179,243	230,496	245,838

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. 5.1-1).
As of March 2011, product information data registered in the JICFS/IFDB covered over 5 million products from 30,000 manufacturers. About 5,300 companies, of which 85% are retailers and 7% 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.

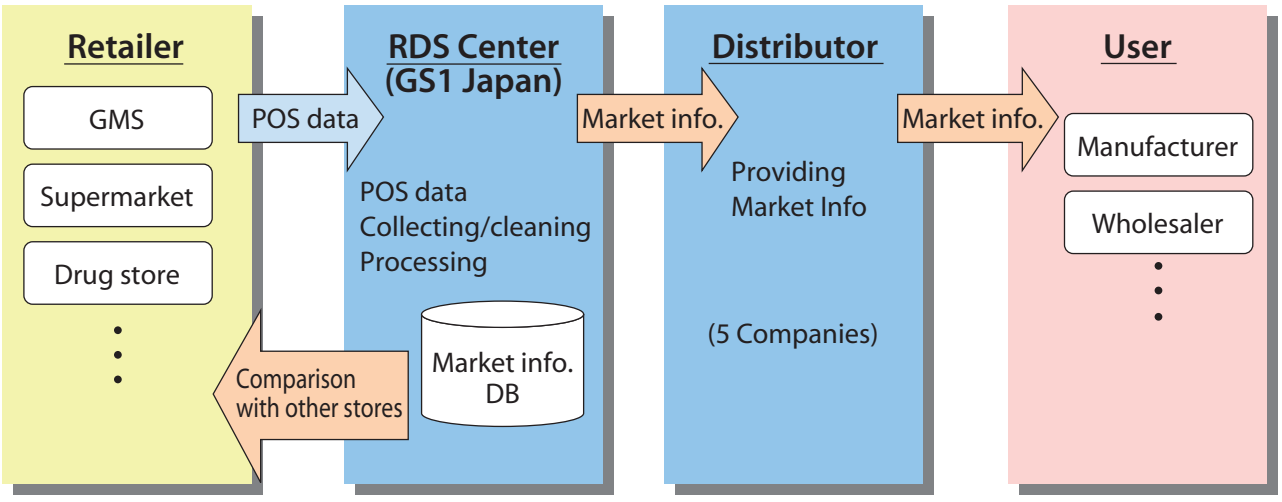
5.2 RDS (Ryutsu POS Database Service)

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. 5.2-1 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.

5.2.1 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 new 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. 5.2.2-1).
The information can be also utilized as effective tools by wholesalers to provide retailers with well-developed support, such as proposals for selection of product lines targeted to market trends, and by product manufacturers for product development as well as planning and reviewing sales strategies. Additionally, RDS data has recently been used by some Japanese universities as basic data for economic analysis.

Fig. 5.2-1 RDS System



5.2.2 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.

<Case example of utilization at a small-scale grocery supermarket> : Leaving it entirely up to someone is not a matter of trust!

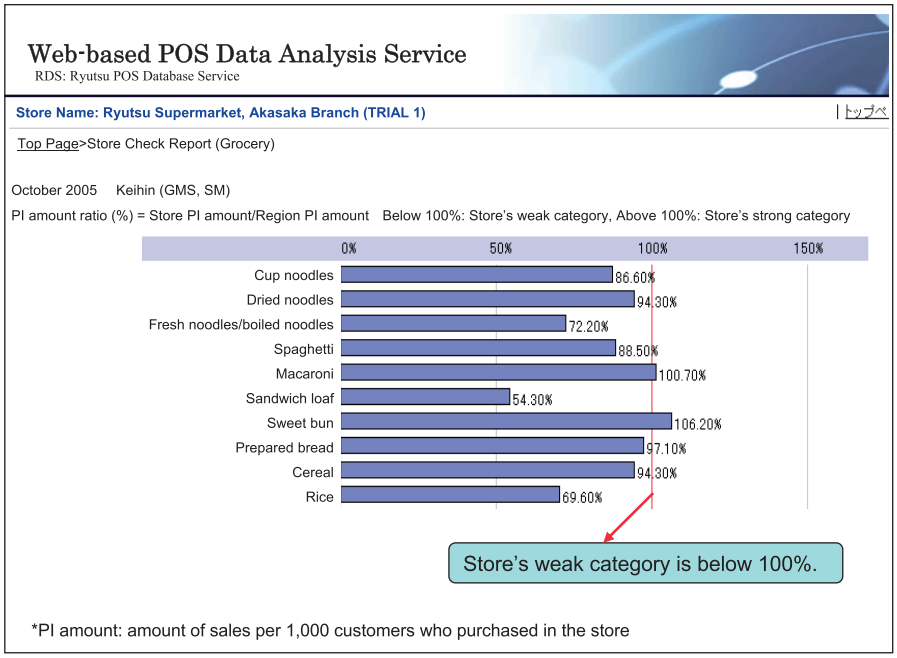
Before participating in RDS, employees at Supermarket A only saw the data proposed to them by suppliers. The employees could not utilize their own POS data because the data volume was huge and they did not know how to view and use the data. As a result, store managers and buyers took a fairly intuitive approach to selecting products without analyzing the exact sales status in the store using POS data. The management was not involved in this selection process.

The management realized that leaving product selection entirely up to store managers and buyers is not a matter of trust and decided to utilize Web-based POS Data Analysis Service because they felt that, "anyone could easily understand their own store's problems by graphs and colorful data displays and anyone could easily share and use the data over the Internet." Therefore, they decided to use it as an internal information exchange tool as follows.

1. Management reviews the monthly reports and asks five questions on the points that caught their attention to the store manager.
2. The store manager reports back to the manager on the five points with detailed explanation based on the figures in the reports.
3. Store manager proposes three points of improvement/changes based on the reports.
4. The management evaluates the development of proposed changes based on the POS Data Analysis Service three months later.

One of the major achievements is smooth communication among everyone from top management to persons in charge by viewing the Priority Reports together.

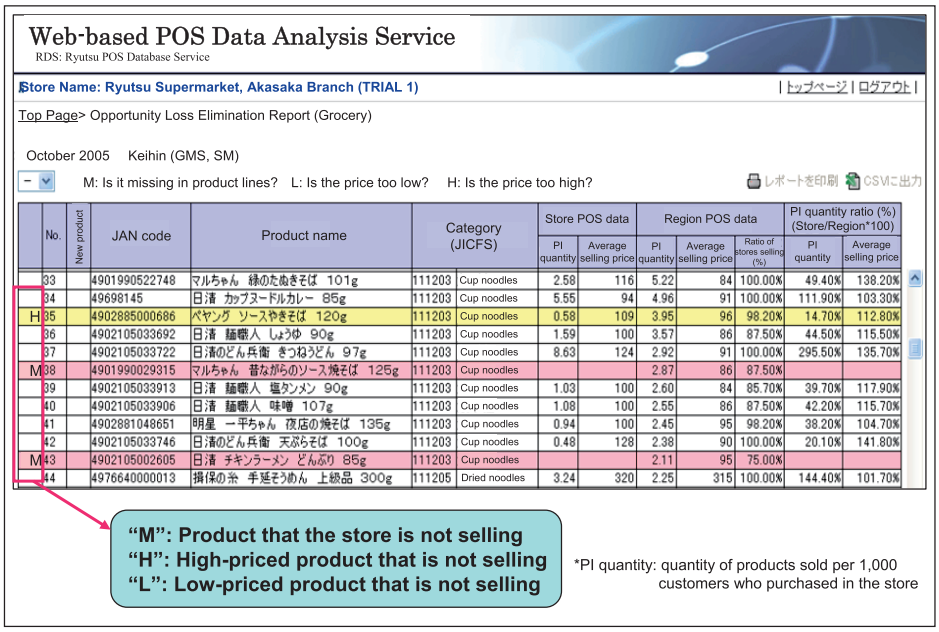
Fig. 5.2.2-1 Web-based POS Data Analysis Service : Store Evaluation Report



[Features of Report]

- It displays the graph comparing PI amount of the store and that of the region (other stores) by category.
- It clearly shows weak (strong) categories.

Fig. 5.2.2-1 Web-based POS Data Analysis Service : Opportunity Loss Elimination Report



	No.	New product	JAN code	Product name	Category (JICFS)		Store POS data PI quantity	Store POS data Average selling price	Region POS data PI quantity	Region POS data Average selling price	Region POS data Ratio of stores selling (%)	PI quantity ratio (%) (Store/Region*100) PI quantity	PI quantity ratio (%) (Store/Region*100) Average selling price
	33		4901990522748	マルちゃん 緑のたぬきそば 101g	111203	Cup noodles	2.58	116	5.22	84	100.00%	49.40%	138.20%
	34		49698145	日清 カップヌードルカレー 85g	111203	Cup noodles	5.55	94	4.96	91	100.00%	111.90%	103.30%
H	35		4902885000686	ペヤング ソースやきそば 120g	111203	Cup noodles	0.58	109	3.95	96	98.20%	14.70%	112.80%
	36		4902105033692	日清 麺職人 しょうゆ 90g	111203	Cup noodles	1.59	100	3.57	86	87.50%	44.50%	115.50%
	37		4902105033722	日清のどん兵衛 きつねうどん 97g	111203	Cup noodles	8.63	124	2.92	91	100.00%	295.50%	135.70%
M	38		4901990029315	マルちゃん 昔ながらのソース焼そば 125g	111203	Cup noodles			2.87	86	87.50%		
	39		4902105033913	日清 麺職人 塩タンメン 90g	111203	Cup noodles	1.03	100	2.60	84	85.70%	39.70%	117.90%
	40		4902105033906	日清 麺職人 味噌 107g	111203	Cup noodles	1.08	100	2.55	86	87.50%	42.20%	115.70%
	41		4902881048651	明星 一平ちゃん 夜店の焼そば 135g	111203	Cup noodles	0.94	100	2.45	95	98.20%	38.20%	104.70%
	42		4902105033746	日清のどん兵衛 天ぷらそば 100g	111203	Cup noodles	0.48	128	2.38	90	100.00%	20.10%	141.80%
M	43		4902105002605	日清 チキンラーメン どんぶり 85g	111203	Cup noodles			2.11	95	75.00%		
	44		4976640000013	揖保の糸 手延そうめん 上級品 300g	111205	Dried noodles	3.24	320	2.25	315	100.00%	144.40%	101.70%

[Features of Report]

- It shows hot-selling products and opportunity losses of the store.
- A hot-selling product is the product whose Region PI quantity is above 2 and Region ratio of stores selling is above 70%. (In case of commodities, Region PI quantity is above 0.7.)

*1 PI

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.

*PI quantity = quantity of products sold per 1,000 customers who purchased in the store.

6. Approach to Industry

6.1 Supply Chain Standards Management & Promotion Council

In April 2009, the Supply Chain Standards Management & Promotion Council was founded 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 2.1.1), 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 Supply Chain Standards Management & Promotion Council held its inaugural General Assembly in Tokyo in April 2009.

The council includes the trade associations of producers, distributors and sellers in the consumer goods industry as full members and IT businesses as supporting members. As of July 2010, the council has 48 full member organizations and 139 supporting members. In 2010, the council is being operated with the following 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 2010, the committee is composed of 14 of the full member organizations.

(3) Working Groups

The Council has six working groups as follows (See Fig. 6.1-1).

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.

2) Product Master Data Working Groups

This group has been working on the product master data message and released usage guidelines for apparel products. In 2011, the group is planning to publish guidelines for fast moving consumer goods (FMCG) and over-the-counter (OTC) drugs.

3) 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.

4) Logistics System Working Group

This group maintains and manages the implementation guidelines for dispatch lists used together with logistics labels inked to the message of the Ryutsu BMS.

5) Ryutsu BMS Web EDI Working Group

This group gathers requirements on the Ryutsu BMS compliant Web EDI system and service and publishes the guidelines. In March 2011, the group announced a basic policy on exchanging Ryutsu BMS messages

Fig. 6.1-1 Management system of the council

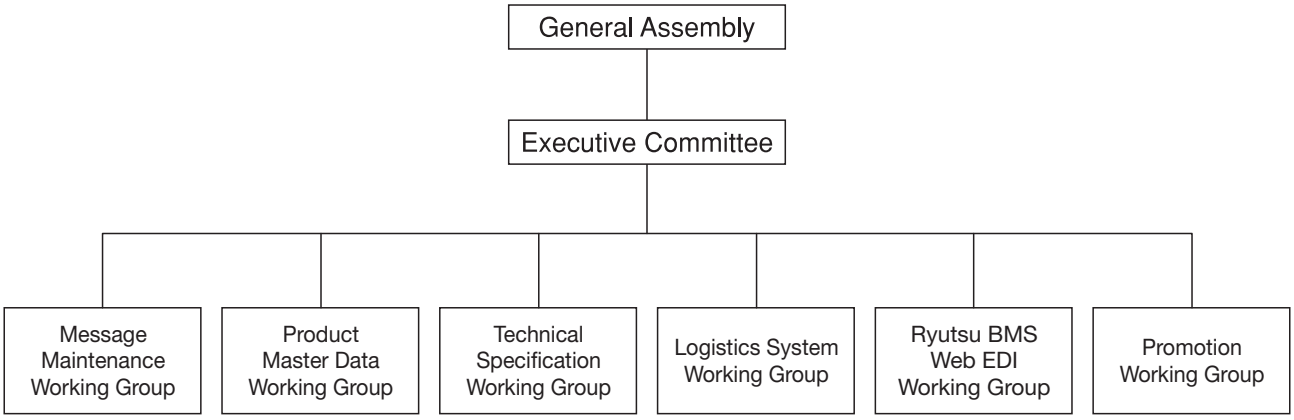
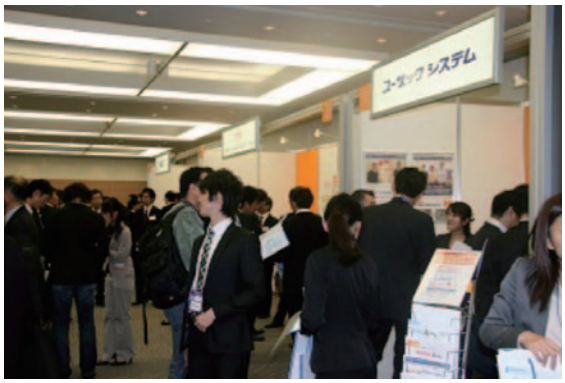


Fig. 6.1-2 Ryutsu BMS Forum & Exhibition 2010



when using Web EDI.

6) Promotion Working Group

This group examines and implements steps to encourage wider adoption of the Ryutsu BMS among SMEs.

(4) Activities for promotion and increasing adoption

To encourage wider use of the Ryutsu BMS, the council is doing 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 on the Ryutsu BMS at several major cities across the country.

2) Holding the Ryutsu BMS Forum & Exhibition

As in the previous year, the council held the Ryutsu BMS Forum & Exhibition in November 2010. At this event, in addition to various seminars and panel discussions, Ryutsu BMS-related products were exhibited by supporting members. Over 400 participants attended the Ryutsu BMS Forum & Exhibition 2010.

5) Publication of the "Understanding Ryutsu BMS–Gaining Visibility" Brochure

In 2010, the council published a brochure targeting top executives in retail businesses. It is very important for executives to understand that there are many benefits in EDI that enable visibility in the supply chain and inventory.

(5) Registration of the Ryutsu BMS trademark

GS1 Japan has applied for trademark registration of the Ryutsu BMS logo to be used for recommending products and services that comply with the Ryutsu BMS specifications. There are already 64 products accredited and permitted to use the logo.

Fig. 6.1-3 Brochure

Fig. 6.1-4 Ryutsu BMS logo

みんなつながる 流通BMS

6.2 GS1 Healthcare Japan

6.2.1 Background: Aiming at preventing medical errors and 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 instruments and materials used in manufacturing logistics, in diagnosis and treatment, and in the collection of these products to be able to prevent errors and increase the efficiency of healthcare services. Responding to this situation, GS1 has held 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 equipment 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.

6.2.2 Purposes and membership structure of GS1 Healthcare Japan

The goal of GS1 Healthcare Japan is to achieve patient safety by preventing medical errors using GS1 Standards. Traceability in healthcare as well as efficient logistics and administrative operations will be achieved through this effort. With the close cooperation of trade associations, government offices and other organizations, GS1 Healthcare Japan hopes to contribute to the overall development of the healthcare industry by conducting various projects using product identification with barcodes, 2-D symbols and RFID to promote standardization and implementation. As of August 2011, GS1 Healthcare Japan has 43 corporate members, 18 individual members, 17 trade associations and 23 supporting members.

6.2.3 Activities of GS1 Healthcare Japan

The activities of GS1 Healthcare Japan are as follows:

1) Standardization and research activities.
   - Investigating optimal product identification for medical instruments and materials.
   - Investigating optimal product identification for regulated pharmaceuticals.
   - Investigating optimal means of ensuring healthcare safety at medical institutions using automatic data reading.
2) Exchanging information with manufacturers, wholesalers, medical institutions and regulatory organizations.
3) Using the results of the above activities to exchange information with and make proposals to government agencies.

Beginning in the summer of 2009, GS1 Healthcare Japan has started holding four working group meetings. The scope of these groups is as follows:

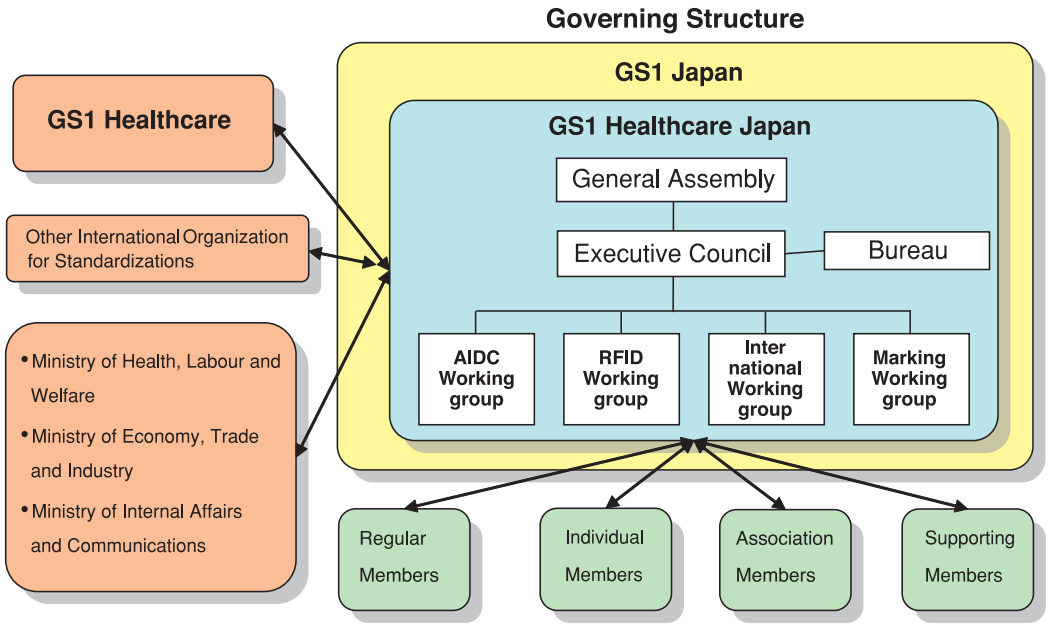
- AIDC Working Group: researching and discussing the utility and issues of GS1-128 for business systems in the healthcare sector.
- RFID Working Group: investigating optimal use of RFID tags in the supply chain between manufacturers and wholesalers.
- International Working Group: drafting the proposal for the Global Harmonization Task Force's (GHTF) public comments about Unique Device Identification (UDI)
- Marking Work group: drafting the guideline for marking 2D symbols on steel medical instruments

Fig. 6.2.3-1 GS1 Healthcare Japan General Assembly

Fig. 6.2.3-2 Surgical Instruments with RFID laid on Reader/Writer

Fig. 6.2.3-3 Ceramic RFID Tags attached to medical devices

Fig. 6.2.3-4 Governing Structure



7. Study Groups

7.1 Study Group for 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 monthly seminars on various subjects 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 FY2011, the workshop has a membership of 65 companies including retailers, wholesalers, product manufacturers, system vendors and consulting firms.
The main workshop topics are as follows:

- Introduction of implementation cases of the Ryutsu BMS
- Introduction of logistics information systems in the wholesale industry
- Introduction of logistics information systems in the retail industry
- Introduction of state-of-the-art logistics information systems by member companies
- Introduction of logistics information systems in the consumer products manufacturing industry
- Introduction of logistics information systems in the apparel industry
- Tours of user companies

Fig. 7.1-1 Membership-based Workshop

Fig. 7.2-1 ICT-Oriented Wholesale Industry Forum

7.2 Study Group for 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 its membership is currently 40 companies.
The group is divided into several sub-working groups according to members' interests, and each hold monthly meetings. There are other activities including an annual forum, which is the biggest event, training seminars for new employees in wholesale companies, and advanced technology study tours.
In 2011, we will expand to specific individual subjects for the 2010 focus on "Environmental Problems To Be Addressed by the Wholesale Industry" and discuss them to summarize recommendations of the wholesale Industry.

7.3 Study Group for 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. 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.

Distribution and supply chains in Japan are composed of three parts-product manufacturers, wholesalers and retailers-thus it is important for us 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.

8. Supporting IT Implementation at Local Shopping Streets

It is estimated that there are about 13,000 local shopping streets throughout Japan. Such shopping streets are composed mainly of small and medium retailers and service traders (SMEs). And these businesses have recently been revalued because they not only supply products and services but also support the community infrastructure by, among others, maintaining and inheriting community and traditional culture and helping to keep their towns safe. However, these SMEs have been increasingly going out of business for various reasons, and shopping streets have continued to decline since their peak in 1982.

SMEs tend to face bigger challenges to use information and communications technology (ICT) than large retailers. GS1 Japan has conducted studies and pilot programs on various ICT systems in cooperation with shopping streets and has supported ICT introduction by many SMEs since the 1990s.GS1 Japan has now expanded the subject of these studies to include new systems and local revitalization to support SMEs.

Some businesses that we have supported and studied are presented below.

8.1 Loyalty card system

The loyalty cards issued by shopping streets mainly aim at gaining more customer loyalty to the shopping street businesses. Loyalty cards are used as tools for collecting customer data to encourage repeat purchases by giving customers points according to the purchase amount and offering them a variety of services and effective sales promotions. Recently, there have been cases in which loyalty cards have been used for community currency purposes by, for example, offering customers points for their contribution to the community or the environment.

8.2 Group contracts for credit cards and debit cards

In shopping streets where there is much use of credit cards by purchasers, a cooperative group contract between member stores and a credit card company is very advantageous: shopping streets enjoy alternative payment options for consumers and decreased fees for the member stores, while the credit card company benefits from simplified collection processing.

8.3 Development of shopping street websites

Some shopping streets create a website and use it to provide information, mainly for sales promotion purposes. Some of them sell member stores'merchandise online, and others use customers' mobile phones as sales tools and display sales promotion coupons on the mobile phone screens.

*1 RFID HF Tag

8.4 Cooperation with other card systems

Recently, shopping streets have been increasingly adding their own unique features to existing card systems instead of developing new systems. Some of them provide various services and help revitalize their local economies by cooperating with the use of IC cards that adopt a Felica contactless IC card technology managed by transportation companies (*1) or IC cards managed by major retail companies and Basic Resident Registration Cards issued by local governments.

8.5 Acceptance of electronic money

As with credit and debit cards, shopping streets are now accepting electronic money in an effort to increase customer conveniences and gain new customers by adding this new means of payment. Electronic money is suitable for small payment amounts and has a high affinity for the above-mentioned loyalty cards and transportation IC cards. Cooperating with widely used electronic money has become very common for these cards recently.

Fig. 8-1 Motosumi Oz Street Shopping District, a community-based shopping street

9. OBN (Open Business Network)

Internet construction technology (controlled IP network)

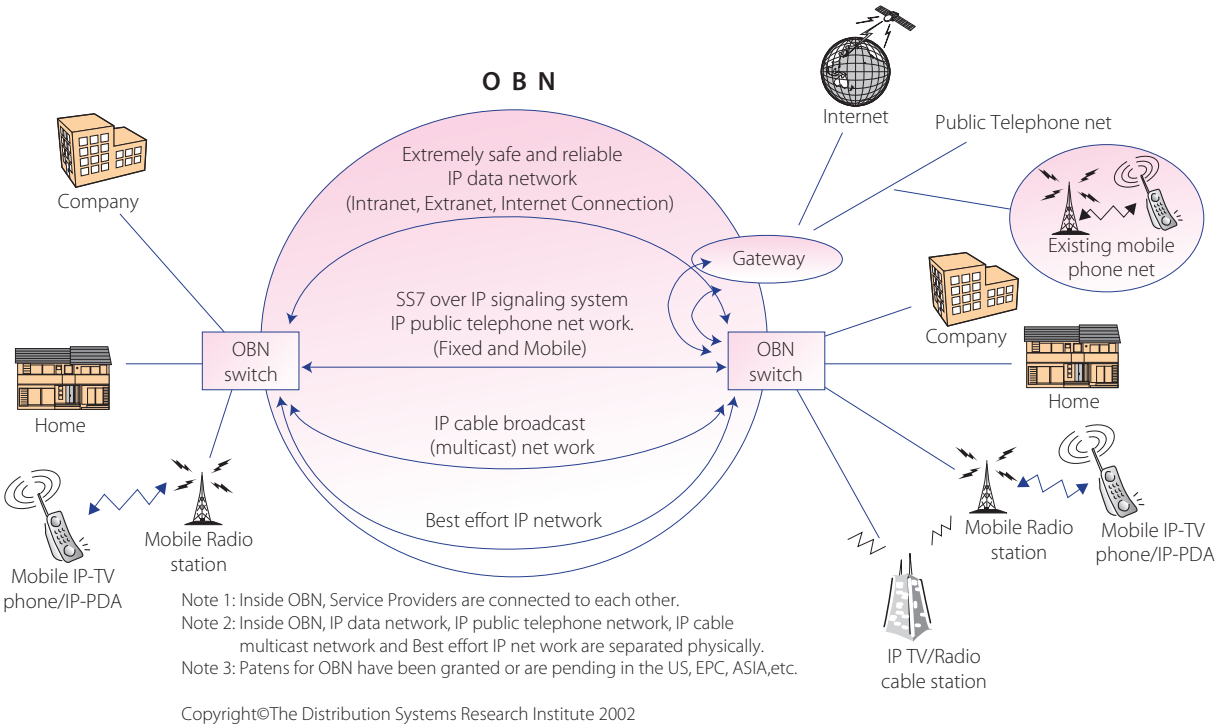
Basic patents that describe the next generation Internet construction technology (IP in IP of virtual network system have been granted in Japan, the United States, and UK. They detail the controlled IP (All IP) network, which is the world's first network that can integrate business data, telephony services, and broadcast type services. OBN (Open Business Network), the only next generation IP network that can offer much higher security and reliability than the present Internet, was developed by The Distribution Systems Research Institute jointly with professor Miyaguchi of Shibaura Institute of Technology, in response to demands of many industrial fields with key interest from the distribution industry.

OBN technology has been licensed to 1 carrier, NTT Communications Corporation, who began to offer commercial OBN service from May and August of 1999, respectively.

Due to its high level of security and reliability, OBN has been adopted as the Intranet and Extranet of the Japanese Defense CALS and Electronic Settlement of Credit Card or Electronic Money. It is spreading widely among distribution companies as well as fields such as manufacturing and finance.

Fig. 9-1 First in the World to Complete the Basic Communication Technology for First ALL-IP Network (Controlled IP Network)

— Integrating all IP Data Networks (Intranet/ Extranet/Internet connection), Mobile and Fixed public IP telephone Networks and IP multicast Cable TV and Radio broadcast networks within the extremely safe and reliable OBN —



Note 1: Inside OBN, Service Providers are connected to each other.
Note 2: Inside OBN, IP data network, IP public telephone network, IP cable multicast network and Best effort IP net work are separated physically.
Note 3: Patens for OBN have been granted or are pending in the US, EPC, ASIA,etc.

E-Mail: info@obn.dsri.jp
URL: http://www.obn.dsri.jp

10. User Support

10.1 Promotional and Educational Activities, Seminars & Consultation

GS1 Japan holds seminars covering a wide range of topics such as the GS1 System, Product Catalogue (JICFS/IF-DB), EDI, and EPCglobal for promotional and education purposes, and these events are well attended.

GS1 Japan also organizes a special seminar in January of each year to which executives of major retailers and wholesalers are invited as lecturers.

GS1 Japan also holds the Barcode Basic Course, an introductory course on barcodes, once or twice a month in Tokyo and Osaka and several times a year in other regional cities. These courses have proven popular with participants. In particular, the barcode introductory course has attracted a large number of participants from companies seeking to acquire a company prefix as well as from solution providers. The total number of participants attending in 2010 came to about 1,000. Starting in July 2010, participants can try scanning various barcodes.

Fig. 10.1-1 Barcode Basic Course

Fig. 10.1-2 Barcode Scanning Experience

In April 2009, GS1 Japan started giving an introductory course on RFID for potential users. This course has since been held every two months and gives instructions mainly on the characteristics of RFID tags, case studies and EPCglobal Standards. In addition to lectures, the course also features demonstrations of bulk reading of EPC tags on the carton boxes on the assumption that actual inspection of goods for delivery and shipment. Participants can also experience actual EPC tag reading at the corner of the class room.

Fig. 10.1-3 Introductory course on RFID

Fig. 10.1-4 RFID tag reading experience

In April 2010, GS1 Healthcare Japan started holding seminars on barcode use for pharmaceutical manufacturers, medical equipment manufacturers, wholesalers, hospital staff and solution providers to provide them with explanations on the compulsory labeling of the GS1-128 bar codes as directed by the Ministry of Health, Labour and Welfare.

GS1 Japan also offers free consultation services on a range of topics including item code registration and utilization, the printing of symbols, GTIN/GLN allocation rules, EDI and EPCglobal standards.

10.2 Publications

To provide information to interested parties, GS1 Japan publishes various printed materials on topics relating to the operation of the GS1 System and on the achievements of SCM-related case studies in Japan.

The following is just a sample of the guidelines (in Japanese only) currently available.

- Trends of Supply Chain Information Systems in Japan 2011-2012
- GS1-128 Guide: Application Identifiers and their Applications
- Basics of Barcode System
- GS1-128 Barcode Standardization Operation Reference Manual for Product Codes of Medical Equipment

In addition, GS1 Japan has been publishing the Distribution and Systems Review four times a year since 1974 and the GS1 Japan Newsletter six times a year since 1982. These periodicals introduce case studies and investigations on such topics as POS systems, EDI, SCM, bar code systems, RFID electronic tags, EPCglobal and other advanced logistics systems, standardization trends and approaches taken by industry, and the current state of global standard introduction.

GS1 Japan also produces videos and CDs about the basics of the GS1 System which are used in the seminars referred to above. We lend them free of charge.

Fig 10.2-1 Basics of Barcode System Review

Fig. 10.2-2 Distribution and Systems

11. The History of GS1 Japan

11.1 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 45 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.

11.2 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.
	EPCglobal Board of Governors Meeting held in Tokyo.
2007	Ryutsu BMS (Japanese XML-EDI Message Standards) published.
	GS1 Mobile Conference held in Tokyo
	GS1 DataBar Study Group launched.
2008	GS1 Healthcare conference held in Tokyo.
	Internet shopping company utilizes JICFS/IFDB.
2009	Supply Chain Standard Management & Promotion Council established.
	GS1 Healthcare Japan established.
2010	Pilot for utilization of GS1 Data Bar in supermarkets
	Mobile Day Seminar held in Tokyo
2011	Mobile Day Event held in Tokyo

12. Reference

12.1 Structure and Aspects of Japanese Supply Chain

It has generally been said that supply chain in Japan are characterized by lengthy, complicated and low productivity. Post-war studies described the features of traditional supply chain in Japan as being small-scale, excessive, family-style businesses with low productivity. The studies also noted pre-modern retailing features and the existence of too many stages between production and retailing for wholesaling, such as secondary, tertiary and other wholesaler levels.

12.1.1 Recent developments

In the past 30 years, however, supply chain in Japan has changed greatly. The following factors are considered to be among those contributing to changes.

First, changes in industrial structures, which include the deindustrialization of Japanese manufacturers resulting from the movement offshore of secondary industries to foreign countries with lower labor costs as well as increasing imports due to a strong yen, which led to the decline of competitive domestic manufacturing areas, especially in regional industries.

Second, there have been changes in population dynamics. As a result of declining birthrates and an aging population, Japan has been experiencing changes in its population structure at a very rapid pace that has not been seen in other countries. Trends in consumption also changed at the same time.

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

In addition, the centers of commerce have shifted from city centers to the suburbs. In 2000, the so-called three laws related to community development, that is, the Act on Measures by Large-Scale Retail Stores for Preservation of the Living Environment, the City Planning Act and the Act on Vitalization in City Centers, were enforced. These laws deregulated the opening of new stores and accelerated the construction of large-scale retail stores in the suburbs where legal controls were less strict, which resulted in the decline in commerce in city centers.

12.1.2 Statistics of recent trends

First let's look at the general situation of wholesalers and retailers in Japan (12.2-1. Summary of the Commerce Statistics). During the 2004–2007 period, the number of wholesalers decreased 10.9% and retailers decreased 8.2%, resulting in an average decline of 8.8% for wholesalers and retailers combined. The number of employees fell by 6.8% for wholesalers and 2.2% for retailers, amounting to a drop of 3.7% for both business types. The annual sales of merchandise decreased 1.3% for wholesalers and 1.0% for retailers, with an average combined decrease of 1.2%.

Next let's consider the situation by number of employees (12.2-2. Number of Japanese Retailers and Wholesalers by the Number of Employees). In the 2004–2007 period, the number of employees decreased at wholesalers of all sizes. The decrease was especially marked at all small-scale wholesalers with 20 employees or less: by 10.8% for wholesalers with one to two employees, by 12.7% for those with two to four employees, by 12.0% for those with five to nine employees, and by 9.7% for those with 10 to 19 employees. For retailers, those with one to two employees decreased staff by 11.5% and those with two to four employees, by 11.1%. In general, the decrease was sharpest in family-run small retailers.

For wholesalers, the merger of large wholesalers and decreases in small-scale businesses, which had existed as secondary, tertiary and other regional wholesalers, can be cited as the factors behind these trends. For retailers, the main cause was the closing of small stores due mainly to competition from large retailers, aging shop owners and the difficulty of finding successors. However, the ratio of small retailers is high even at present, with 44.3% of employees at retailers working at small retailers with one to two employees. If these employees were added to the number of employees at retailers with three to four employees, it would indicate that two-thirds of all retailer employees are hired by small-scale retailers. The ratio of employees at large retail stores with 100 or more staff is only 0.4% of the total retailer workers.

By type of business (12.2-3. Number and Sales of Retail Stores by Type of Business), department stores and GMSs suffered decreases both in the number of stores and annual merchandise sales. By contrast, the apparel stores achieved high growth of nearly 20% in the number of stores and 9% in sales. Drugstores also enjoyed a considerable 16.4% increase in sales, although their store numbers dropped.

In the case of large-scale wholesalers (12.2-4. Top 20 Wholesale Companies in Japan), the sales of the top three drug wholesalers have been firm, partly supported by the good performance of drugstores as noted above.

For large retailers (12.2-5. Top 20 Retail Companies in Japan), new mass merchandisers of consumer electronics such as Yamada Denki and Bic Camera, and Uniqlo, a fast fashion company, are among the retailers that have been achieving rapid growth in a business environment in which GMSs and many other retailers have faced difficulties.

Similarly, the sales of department stores have fallen for all articles except food. In particular, the sales of women's clothing and accessories, though it had accounted for half of department store clothing sales which was almost 40% of their total proceeds, have dropped, greatly contributing to the overall decrease in their revenues (12.2-7. Sales by Type of Merchandise in Department Stores).

12.2 Statistics on Japanese Retail Industry

Table12.2-1 Summary of the Commerce Statistics

Industrial Category	2004	2007	2004/2007 Growth (%)
Total No. of stores	1,613,318	1,470,995	-8.8
Wholesalers	375,269	334,240	-10.9
Retailers	1,238,049	1,136,755	-8.2
Total No. of employees	11,565,953	11,133,882	-3.7
Wholesalers	3,803,652	3,544,507	-6.8
Retailers	7,762,301	7,589,375	-2.2
Total of Annual Sales (¥Million)	538,775,810	545,250,569	1.2
Wholesalers	405,497,180	410,678,894	1.3
Retailers	133,278,631	134,571,675	1.0

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

Table12.2-2 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

Table12.2-3 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 12.2-4 Top 20 Wholesale Companies in Japan

(As of 2008)

2008	2007	Company Name	Location of Head Office	Annual sales (¥Million)	Annual Growth (%)	Business Line
1	1	Mediceo Paltac Holdings	Tokyo	2,463,569	9.3	Drugs
2	2	Alfresa Holdings	Tokyo	1,934,868	9.3	Drugs
3	3	Suzuken	Aichi	1,641,331	3.4	Drugs
4	4	Kokubu	Tokyo	1,471,545	3.1	Grocery
5	5	Ryoshoku	Tokyo	1,402,308	0.2	Grocery
6	6	Nippon Access	Tokyo	1,367,782	1.9	Grocery
7	7	Toho Holdings	Tokyo	838,903	4.2	Drugs
8	8	Nihon Shuppan Hanbai	Tokyo	770,040	2.3	Books/Audio/Video/Music Instruments
9	10	Kato Sangyo	Hyogo	641,527	-2.3	Grocery
10	11	Itochu Shokuhin	Osaka	604,737	6.7	Grocery
11	9	Tohan	Tokyo	583,537	3.8	Books/Audio/Video/Music Instruments
12	12	Arata	Chiba	569,867	-6.8	Sundry goods/Medical Supplies
13	14	Nihon Shurui Hanbai	Tokyo	502,736	3.3	Grocery
14	13	Mitsui Foods	Tokyo	501,294	4.5	Grocery
15	15	Forest Holdings	Oita	388,873	-5.1	Drugs
16	18	Asahi Shokuhin	Kochi	360,876	5.8	Grocery
17	16	MEIDI-YA	Tokyo	344,071	-4.0	Grocery
18	17	World	Hyogo	342,758	-4.3	Textile
19	19	Food Service Network	Tokyo	314,550	1.4	Grocery
20	21	Vital KSK Holdings	Tokyo	271,076	-4.2	Textile

The source: The Nikkei Marketing Journal

Table 12.2-5 Top 20 Retail Companies in Japan

(As of 2008)

2008	2007	Company Name	Type of business	Location of Head office	Annual sales (¥Million)	Growth (%)
1	1	Seven & I Holdings	Holding Co.	Tokyo	5,649,914	-1.8
2	2	Aeon	Holding Co.	Chiba	5,230,896	1.2
*	*	Aeon Retail	Supermarket	Chiba	2,034,973	-
3	3	Yamada Denki	Specialty store	Gunma	1,871,828	5.9
*	*	Ito-Yokado	Supermarket	Tokyo	1,462,719	-1.8
4	*	Isetan Mitsukoshi Holdings	Holding Co.	Tokyo	1,426,684	-
5	4	Uny	Supermarket	Aichi	1,910,247	-2.1
6	7	J. Front Retailing	Holding Co.	Tokyo	1,096,690	7.9
7	5	Daiei	Supermarket	Tokyo	1,040,850	-13.0
8	6	Takashimaya	Department store	Osaka	976,116	-6.4
9	8	edion	Holding Co.	Osaka	803,004	-5.7
10	9	Yodobashil-Camera	Specialty store	Tokyo	701,277	-1.5
*	*	Mitsukoshi	Department store	Tokyo	669,049	-
11	11	Bic Camera	Specialty store	Tokyo	630,740	11.5
12	12	Fast Retailing	Holding Co.	Yamaguchi	586,451	11.7
13	10	K's Holdings	Specialty store	Ibaraki	574,188	1.1
*	*	7-11 Japan	Convenience Store	Tokyo	540,773	2.5
14	15	H2O Retailing	Holding Co.	Osaka	509,525	8.0
15	16	Izumi	Supermarket	Hiroshima	500,293	6.3
*	*	Sogo	Department store	Osaka	482,144	-4.0
16	17	Life Corporation	Supermarket	Osaka	462,967	5.3
*	*	UNICLO	Specialty store	Yamaguchi	462,343	8.9
17	13	Kojima	Specialty store	Tochigi	459,840	-8.1
*	*	Daimaru	Department store	Osaka	453,454	-5.9
*	*	Seibu	Department store	Tokyo	450,698	-3.7
18	14	Marui Group	Holding Co.	Tokyo	447,399	-9.3
*	*	Isetan	Department store	Tokyo	434,431	-7.2
19	21	DCM Japan Holdings	Holding Co.	Tokyo	426,552	7.8
20	18	Heiwado	Supermarket	Shiga	412,213	-2.1

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

The source: The Nikkei Marketing Journal

Table 12.2-6 Top 10 Convenience Store Chains in Japan

(As of 2008)

2008	2007	Name of stores	Location of Head Office	Group	Annual sales (¥Million)	No. of stores
1	1	Seven-Eleven Japan	Tokyo	Seven & I Holdings	2,762,557	12,298
2	2	Lawson	Tokyo	Mitsubishi	1,557,781	9,527
3	3	Family Mart	Tokyo	Itochu Group	1,334,048	7,404
4	4	Circle K Sankus	Tokyo	Uny	1,095,201	6,166
5	5	Ministop	Chiba	Aeon	302,911	1,772
6	6	Daily Yamazaki	Chiba	Yamazaki Baking	222,875	1,647
7	8	Seicomart	Hokkaido	Independent	159,804	1,040
8	7	am/pm	Tokyo	Rex Holdings	195,599	1,129
9	9	Three F	Kanagawa	Independent	122,313	712
10	10	Poplar	Hiroshima	Independent	104,768	701

The source: The Nikkei Marketing Journal

Table 12.2-7 Sales by type of merchandise in department stores

(As of 2008)

	Total sales (¥Million)	%
Total sales	7,381,363	100.00%
Apparel	2,713,304	36.76%
Accessories	936,476	12.69%
Household goods	368,591	4.99%
Grocery	1,925,252	26.08%
Restaurant	202,493	2.74%
Sundry goods	1,048,746	14.21%
Service	73,234	0.99%
Others	113,267	1.53%
(Shopping gift cards) *	(278,962)	—

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

The source: Japan Department Stores Association

Table 12.2-8 Sales by type of merchandise in chain stores

(As of May 2010)

	Total sales (¥Million)	%
Total sales	1,020,454	100.00%
Grocery	636,661	62.39%
Apparel	110,218	10.80%
Sundry goods	87,801	8.60%
Drugs & Cosmetics	32,902	3.22%
Furniture & Homefurnishing	36,768	3.60%
Home electrical apparatus	10,591	1.04%
Other living goods	41,428	4.06%
Service	3,468	0.34%
Others	60,617	5.94%

The source: Japan Chain Stores Association

(62 member companies and 7,852 stores)

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