III New Trend in Inward FDI in Japan

– Age of the Fourth Industrial Revolution –
Contributing to Solving Problems Japan Faces and Expanding Overseas Markets for Japanese Companies

Given that promotion of inward FDI in Japan will introduce superior technologies and new know-how and promote value enhancement of innovation creation and technology accumulation in Japan, the government positions the promotion of FDI in Japan as one of the priority issues in its growth strategy. Japan has an established reputation as "a huge sophisticated market." In addition, existence of Japanese companies and research institutes with advanced technologies and infrastructure favorable for R&D is also appreciated in recent years. Establishment of R&D centers by foreign capital has become one of the recent FDI trends in Japan.

In this context, foreign companies are actively working to promote innovation in Japan by fusing their technologies with Japanese companies' technologies in the field of IoT (Internet of Things) and artificial intelligence (AI) with a background of rapid progress of the Fourth Industrial Revolution. In a related development, foreign companies are increasing their presence with the penetration of "Open Innovation" that introduces technologies and ideas from outside to create new values. Some of them found commercial opportunities in Japan which is also called a "frontrunner in overcoming global challenges" and are contributing to solutions of various problems.

E-commerce (EC) that has rapidly spread in recent years with the development of the Internet is growing to the infrastructure that facilitates cross-border transactions. Foreign companies in the field of "cross-border EC" are establishing business sites for product procurement in Japan one after another. They are likely to become important partners for Japanese companies to cultivate overseas markets.

This chapter describes a "new trend of FDI in Japan" in the age of the Fourth Industrial Revolution with a focus on efforts by foreign-affiliated companies contributing to solutions of Japan's problems and cultivation of overseas markets of Japanese companies.

1. Age of the Fourth Industrial Revolution – contributing to solving Japan's problems through introduction of IoT and AI technologies

Typical challenges for Japan, which is called a "frontrunner in overcoming global challenges," may be attributed to the progress of population aging with declining birthrate and the accompanying labor shortage. According to estimates by the National Institute of Population and Social Security Research, Japan's total population will decline from 127.09 million in 2015 to 88.08 million in 50 years, while the percentage share of aged people will rise from 26.6% to 38.4%.

Labor shortage is expected to bring serious consequences to society including economy, public finance and industries. In medical sites, shortage of doctors is progressing while the number of patients is increasing as the population ages. In the international comparison (2014) by OECD (Organization for Economic Cooperation and Development), Japan is ranked 26th in the number of practicing physicians per 1,000 population, which is at the lowest level among the 30 countries. The situation is more serious in local regions. Furthermore, there is a concern that experience and knowledge in the field of agriculture and manufacturing might not be passed on to the next generation due to lack of successors.

As means to solve these problems, efforts to use technologies such as IoT and AI are now rapidly spreading in Japan. Efforts to improve work efficiency and upgrade operations through digitalization, analysis and utilization of past analog experiences have started in every field. Under these circumstances, a "new trend of FDI in Japan" is accelerating in which foreign companies collaborate with Japanese companies to use latest technologies to solve problems.

(1) Countermeasures for medical specialist shortage, improvement of labor productivity, promotion of regional cooperation among hospitals and quality improvement in healthcare

HealthTech company **Philips Japan** ("Philips," Netherlands) set up an R&D center in Showa University Hospital in February 2017, and started researching a "remote management program for intensive care patients" to network ICUs of multiple hospitals. With needs for ICUs increasing year by year, shortage of medical specialists and improvement of utilization efficiency of high-cost ICUs have become challenges in Japanese hospitals.

The company aims to introduce a system that enables remote monitoring of conditions, bio-information, medication history, etc. of ICU patients through a network. By an effective approach drawn up through combinations of big data of more than 3 million cases, the length of stay in ICUs was reduced by 20% in a comparative experiment in the United States. From a control center, one medical specialist and three nurses can monitor 150 patients. In Japan, collaboration started toward practical use at the proposal of Showa University Hospital that was quick to notice the effectiveness of the system. Because a limited number of medical specialists and nurses can effectively care ICU patients, the system can be used for medical cooperation with local hospitals suffering from medical specialist shortage. Philips plans to advance R&D toward practical use of the system within FY 2018 and then introduce it in Japanese market on a full scale.

Society 5.0 sought by the Government of Japan

– Realization of Connected Industries through the 4th Industrial Revolution

In its new "Growth Strategy 2017" (cabinet decision made in June 2017) and the "Basic Policy on Economic and Fiscal Management and Reform 2017," the government announced that it would work for realization of Society 5.0 (super smart society where people can live comfortably and abundantly in all situations) to address various social issues by incorporating innovations that the 4th Industrial Revolution has progressed rapidly into every scene of industry and social life.
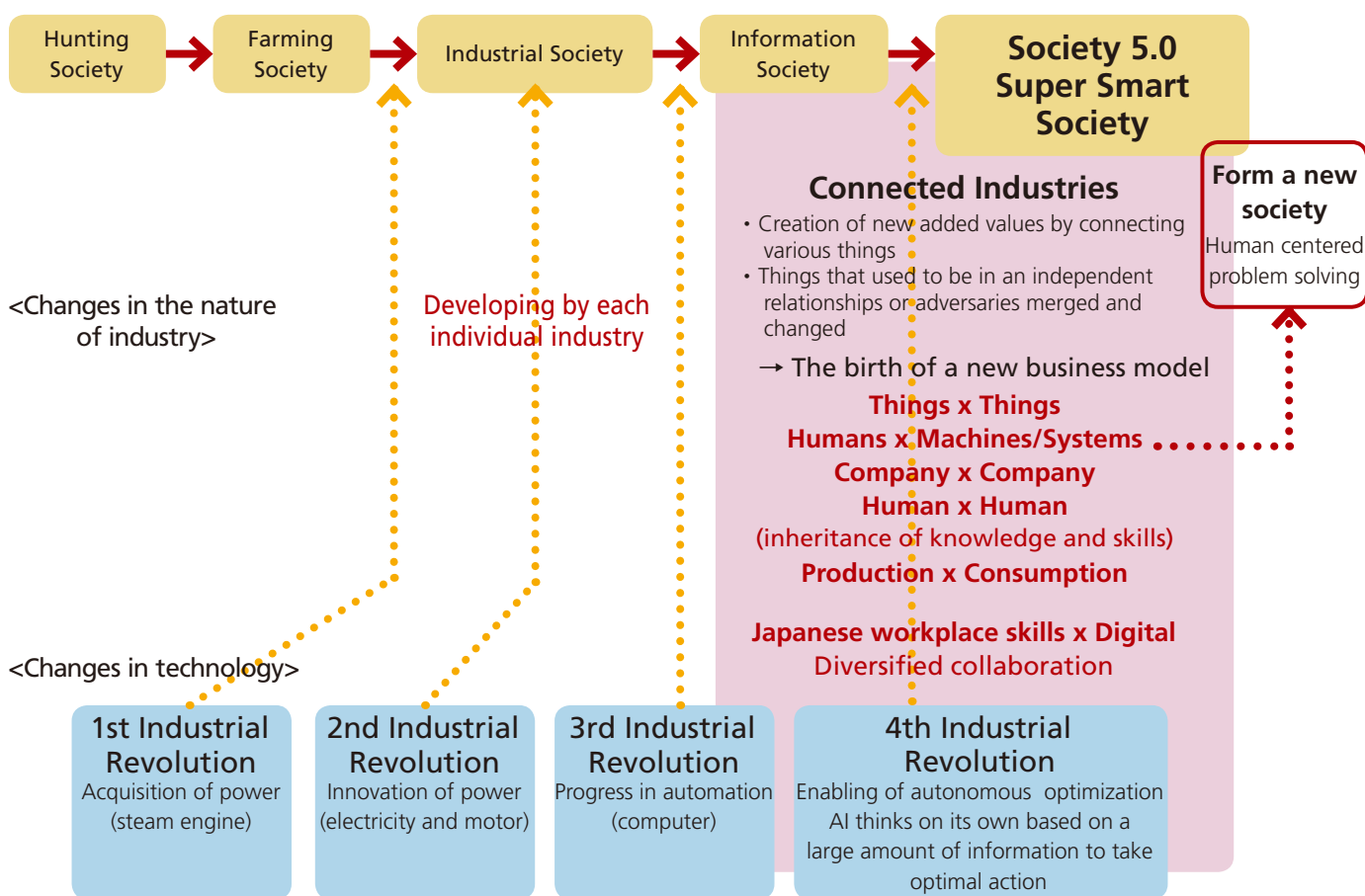
Following the 1st Industrial Revolution that realized mechanization by steam engine, the 2nd Industrial Revolution that enabled mass production using electricity and the 3rd Industrial

Revolution with automation by computer, the 4th Industrial Revolution is believed to deliver autonomous optimization by IoT, big data, artificial intelligence (AI), robotics, the sharing economy and other technological innovations.
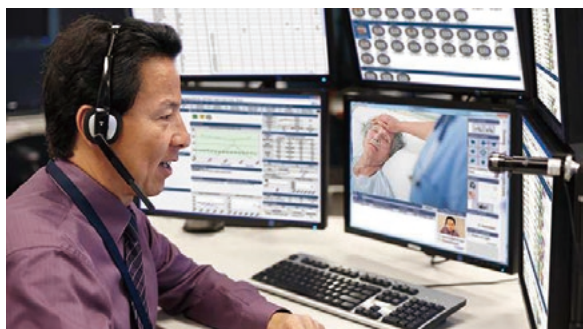
By realizing "Connected Industries" that connect various things including things to things, humans to machines/systems, humans to technology, companies belonging to different industries, people over generations and manufacturers to consumers, through a network using technologies such as IoT, the government aims to create an industrial society that produces new added values contributing to solving problems of customers and society.

Chart 3-1 Connected Industries leading to Society 5.0

<Social changes>

Hunting Society → Farming Society → Industrial Society → Information Society → **Society 5.0 Super Smart Society**

Connected Industries

- Creation of new added values by connecting various things
- Things that used to be in an independent relationships or adversaries merged and changed

→ The birth of a new business model

Things x Things
Humans x Machines/Systems
Company x Company
Human x Human
(inheritance of knowledge and skills)
Production x Consumption

Japanese workplace skills x Digital
Diversified collaboration

Form a new society
Human centered problem solving

<Changes in the nature of industry>

Developing by each individual industry

<Changes in technology>

1st Industrial Revolution Acquisition of power (steam engine)

2nd Industrial Revolution Innovation of power (electricity and motor)

3rd Industrial Revolution Progress in automation (computer)

4th Industrial Revolution Enabling of autonomous optimization AI thinks on its own based on a large amount of information to take optimal action

[Source] "Future Vision towards 2030s (the New Industrial Structure Vision)" (Ministry of Economy, Trade and Industry)

Remote management program for intensive care patients (Courtesy of Philips)

Philips will also advance R&D of a system to network multiple hospitals for "remote pathology support (Digital Pathology)." In Japan there are only about 2,200 certified pathologists (0.76% of all physicians, Source: Japanese Society of Pathology) who make diagnoses based on microscopy of cancer or other lesion tissues / cells collected from patients. Their absolute shortage has become a serious problem. Project partners Kobe University and Nagasaki University have put emphasis on remote pathology support and pathologist education in remote places. This system promises the promotion of regional medical cooperation as well as improvement of quality in medical care through involvement of multiple pathologists. The system can also be used for remote instruction to young physicians and by pathologists who are caring for children and therefore have place/time restrictions for working. In partnership with Japanese medical institutions with sophisticated pathological diagnosis technique and Japanese companies with excellent imaging diagnostic technologies, Philips is considering export to Asia in the future.

GE Healthcare Japan, a group company of GE (US) that is promoting IoT across the group is working on the "Brilliant Hospital" project. The project connects people, things and information in hospitals through the Internet and analyzes collected data to identify operation issues and improve management efficiency. Starting from development of a failure prediction system for medical instruments, the company is carrying out verification projects in hospitals in Osaka and Mie to collect and analyze various data (location information, operational status, inspection history of medical instruments, asset information, etc.) using Japan's beacon technology (radio transmitter that broadcasts distinctive signals to obtain location and other information). As the population ages, Japan's medical practice needs improvement of productivity and quality in medical care through efficient use of medical equipment, asset optimization and improvement of work efficiency of medical practitioners. The company is promoting the project aiming to provide a solution.

Biopharmaceutical company **Pfizer** (US) will work to develop a new digital health business of diagnostic aid based on enormous clinical trial data and analysis know-how the company has accumulated. In cooperation with Japanese medical equipment manufacturers, universities and other partners, the company will obtain bio-data using sensor mats that can measure sleep state (breathing, heart rate, etc.) and eye movement measuring apparatuses. By analyzing the data using its unique algorism and identifying the data pattern characteristics of the patient, the company aims to apply the system to disease prevention and diagnostic aid.

Speaking of diagnostic aid by IT, the Institute of Medical Science, the University of Tokyo, made AI Watson of **IBM** (US) learn about 20 million papers. Then Watson identified in ten minutes the name of a particular leukemia of a patient whose symptom had not improved for six months and contributed to improvement of the symptom, which got into the news. If these technologies are put to practical use, they are expected not only to contribute to labor productivity improvement in medical practice, but also to improve the quality of medical care and promote regional medical cooperation.

(2) Improvement of farm work efficiency and succession of know-how in farm households

The farming population is also aging and their average age is said to be 67. Lack of successors of farm work which has depended on human skills and intuition has become a serious problem. In this context, there are attempts to use IoT and AI technologies to find a clue to solution.

Analog Devices (US), developing semiconductor IC products, carried out an experimental study on smart farm work jointly with **Amazon Web Services** (US), a Japanese application development company CF-K and a strawberry farm Murata's Family Farm in Ibaraki. They installed sensors that automatically measured temperature, humidity, illumination, carbon dioxide concentration and other environmental data, and enabled remote monitoring of the data through smartphones and tablet terminals. By visualizing the optimal production process through using the results of the analysis of the growth data automatically obtained from the sensors for production forecasting, they aim to efficiently increase yield and further improve the quality of the strawberries.

Sensor installed in the farm (Courtesy of Analog Devices)

Auto parts manufacturer **Bosch** (Germany) also announced that it started sales of disease prediction system for greenhouse tomatoes using AI in Japan. The company that is putting efforts into R&D of automatic driving also applies its AI technology in a different industry, agriculture, to contribute to prediction of crop diseases.

Today, when succession of know-how is concerned due to the declining farming population in Japan, technologies of foreign companies are expected to be utilized in these attempts of automation of farming processes and smart farming.

### (3) Productivity improvement and man-hour reduction in manufacturing sites

Efforts to improve work efficiency and productivity using IoT may have been mostly introduced in manufacturing sites that have been committed to Kaizen activities. As various improvement efforts have been made in order to survive in severe international competition, there are efforts to improve productivity and business operations by fusing technologies of foreign and Japanese companies.

GE Healthcare Japan is working on the "Brilliant Factory" project for production optimization at manufacturing sites. Its Hino Factory is one of the seven Showcase Sites chosen from 450 GE factories worldwide for their high productivity and improvement efforts (only one showcase site is selected from the healthcare business). In the factory producing CT detectors for medical use, data obtained from Murata MFG's beacons attached to workers, equipment, facilities, etc. are analyzed using an industrial IoT platform. A system to discover improvement opportunities by displaying traffic lines and operation processes on a large screen contributed to reduction of man-hours. Furthermore, digital acceleration of the lean production method (the method called Toyota Production System that is designed to eliminate waste in manufacturing process) has produced results, which include 65% reduction of time from ordering to delivery in some production lines. The factory accepts a large number of visitors from other companies. The company intends to spread the system to other factories in the world and manufacturing sites in Japan.

Software developer **Dalian Hi-Think Computer Technology** (DHC, China) opened **Laboratory of Hi-Think** as a new R&D site in Kyoto Research Park at Shimogyoku, Kyoto, in February 2017. For the company that has sites in Tokyo and Okinawa and has developed software for the Japanese market, this is the first site dedicated to R&D. The company, jointly with Osaka University and an engineering company of Nagoya started R&D of solutions for manufacturing sites using machine learning by AI and IoT technologies. The aim is to prevent stopping of machines by making AI learn how machinery equipment failures occur, which has been judged by skilled engineers based on their experience, and detecting defects such as malfunctions. This way, you can automate manufacturing sites using a compact system without large-scale and high-cost equipment investment. The company aims to contribute to improvement of operational efficiency and cost reduction in factories.

In fall 2016, software developer **CENIT Japan** ("CENIT," Germany) jointly with HIROTEC, an auto parts manufacturer of Hiroshima, worked on an experimental study of a digital factory (virtual factory) of a weld line for auto body products. It was an attempt for 3D simulation at once by collecting data from equipment such as robots and jigs of various manufacturers used in the production line. CENIT was a part of a research project related to Industry 4.0 of the government of Germany and has experience in researching on factory automation of aircraft and automobile manufacturers. Under stiff global competition that calls for reduction in the weight of vehicle bodies and costs, Japan's auto parts manufacturers have to cope with multiproduct and quick delivery production, which requires quick launch of new production lines and swift set-up change of existing lines. Prior simulation of production lines in a virtual factory will enable study of response to possible troubles and failure prediction, and also reduce time for set-up change of

equipment. In the future, the company aims to realize full factory automation by enabling real-time treatment in a virtual factory.
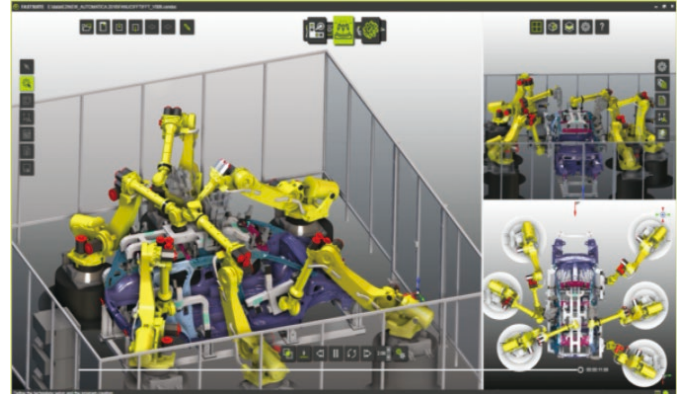
Images of 3D simulation (Courtesy of CENIT)

(4) Efforts to solve problems in other sectors such as finance, tourism and communications infrastructure

Attempts to solve problems using IoT and AI technologies have spread in to fields besides productivity improvement and measures against labor shortage. For example, in the financial sector where FinTech (fusion of finance and IT) market is growing significantly, AI technology has been introduced to detect illegal money transfers. **Skymind** is a US company developing AI-based software used for detection of unauthorized use of access to credit cards and mobile networks abroad. A Japanese subsidiary was established in February 2016 and is undertaking joint researches with the Japanese financial institutions and software application developing companies.

There is also a unique attempt to use IoT for tourism promotion. **LOOPShare** is a Canadian IT company providing electric scooter rental service in seven countries in the world. As the so-called sharing economy market including car sharing and rental bicycles is expanding, the company launched its first overseas subsidiary in Japan in September 2016. Electric scooters and bicycles equipped with a dashboard developed by the company are connected to the Internet to make it possible to reserve them through smartphones or PCs at any time. The service is offered to foreign tourists in five languages and linked also to Chinese electronic payment system targeting increasing Chinese tourists. Electric scooters and bicycles are environmentally sound because they do not emit carbon dioxide. Aiming to use user information and travel data obtained from the system as big data for the tourism strategy of local governments, the company together with a venture company of Kyoto that is developing car navigation systems conducts experimental studies in Okinawa and Kamakura. In a survey of local governments across Japan conducted by the Ministry of Internal Affairs and Communications, tourism ranked first as the sector for which they wish to use big data ("Study Report on the Current State of ICT Use and Application in Regional Areas," MIC (2017)). The company plans to provide the service also in Kyoto, Nara and Shikoku Region to contribute to tourism promotion and regional vitalization.

Dashboard mounted on a scooter (Courtesy of LOOP Japan)

There is also an attempt to strengthen the infrastructure development of IoT in Japan. Telecommunication equipment provider **Ericsson Japan** (Sweden) will start a demonstration experiment of street lights with built-in radios and antennas in Hiroshima, with an eye to the next generation ultrahigh speed network (5G).

With the transmission speed tens of times faster than current 4G LTE, 5G is expected to serve as the network infrastructure for promoting IoT in Japan and be used for real-time information exchange toward automatic driving, for example. However, there is a concern that a large number of additional mobile base stations in downtowns might have a negative impact on the townscape and increase the installation cost. As a way to solve the issue, the company, jointly with Japanese companies such as KDDI and street light manufacturers will work toward practical use of the street lights in Japan.

These efforts promise that problems of Japan as a "frontrunner in overcoming global challenges" will be solved one by one through innovation creation. If collaboration of foreign and Japanese companies continues to generate new products/services that change the whole of Japanese society, it will be an opportunity also for Japanese companies to evolve their technologies. Furthermore, results of joint R&D may spread from Japan to the world.

2. Cross-border EC – contributing to expansion of overseas markets for Japanese companies

Japan's sophisticated market and its position as a "trendsetter" in Asia are part of a major attraction for FDI in Japan. Demand for Japanese products is expanding as they have enhanced their added value and brands by satisfying Japanese consumers who demand high quality. They are highly trusted by overseas (especially Chinese) consumers whose desire to buy is expanding.

Under these circumstances, purchase of Japanese brand products using so-called cross-border EC is also surging in recent years. "Bakugai (shopping spree)" by Chinese tourists visiting Japan is still fresh in our minds, but according to the Ministry of Economy, Trade and Industry, the amount of China's cross-border EC purchase from Japan reached 1,036.6 billion yen in 2016, for the first time exceeding the purchase amount of Chinese tourists visiting Japan. Major reasons may include: more Chinese consumers attach importance to high quality and safety with the increase of their household income, and consumers who have learned to appreciate

Japanese products through their visits to Japan or word of mouth are using cross-border EC as an easy way to purchase without visiting Japan.

Chart 3-2 Comparison of the total purchase amount of Chinese tourist visiting Japan and that of China's cross-border EC from Japan

(Billion Yen)
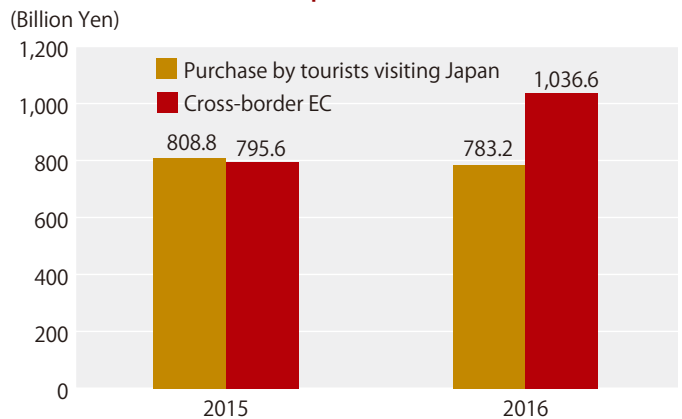
[Source] "Consumption Trend Survey for Foreigners Visiting Japan" (Japan Tourism Agency), "Infrastructure Development pertaining to a Data-driven Society in Japan (a market survey on e-commerce)" Ministry of Economy, Trade and Industry

Seeing a business opportunity in this development, foreign companies operating cross-border EC sites are entering the Japanese market one after another. Their moves draw attention as a new means for Japanese companies to develop overseas markets. Generally "cross-border EC" takes forms such as: (1) a Japanese company opens its own net shop to attract overseas customers (2) it opens its store in a cross-border EC mall by paying a store opening charge and (3) a cross-border EC company directly sells goods purchased from Japanese companies. While major EC sites are launching services to support Japanese companies' development of overseas markets, it is conspicuous that some of the recent entries by foreign companies are primarily based on direct purchase to ensure stable procurement of Japanese brand products.

Below we introduce a "new trend of FDI in Japan" contributing to Japanese companies' development of overseas markets by describing recent cases of foreign EC companies' investment in Japan.

(1) To be a part of the value chain of Japanese companies through direct sourcing

唯品会
vip com
全球精选 正品特卖

Chinese B-to-C EC site operator **Guangzhou VIPSHOP Information and Technology (vip.com)** which ranks third in total B-to-C transactions in China (Source: China e-Business Research Center (CECRC)) established a Japanese corporation in Tokyo in January 2016. The company was founded in China in 2008 and started cross-border EC site operation in 2014.

Since its foundation the company has been rapidly growing with its signature flash sales (quick sale at discount rates for a limited period of time) business model. The number of its users in China exceeded 200 million at the end of 2016.

The company has established overseas locations— in Hong Kong, London, Milan, Paris, Frankfurt, New York, Los Angeles, Sydney,

Seoul and Tokyo, to source products directly from makers and exclusive agents. Instead of renting site space to individual suppliers, vip.com has established a system to directly handle the entire process from product procurement to sales to distribution to ensure a steady supply of Japanese brand products to Chinese consumers. The company enjoys not only the confidence of consumers who "can buy 100% genuine authentic products" but also a deep trust with suppliers concerning "stable procurement of our products," thus building a win-win relationship with its customers and suppliers.

vip.com aims to be a strategic partner for Japanese companies to develop overseas markets by building a collaborative relationship to discover potential best sellers and develop them into attractive goods. The company also hopes to contribute to regional vitalization in Japan by selling in China "hidden 'good things'" rooted in communities of Japan.

(2) Partnering with Japanese companies also for development of overseas markets of fresh produce 🐶 JD.COM

In July 2017, **JD.com**, whose transaction amount is second in the Chinese B-to-C market (Source: China e-Business Research Center (CECRC)), established a Japanese corporation in Tokyo in order to strengthen sourcing of Japanese products and direct transaction with Japanese companies. The company's site attracts as many as 260 million users, together with Alibaba Group, accounts for about 80% of B2C e-commerce transactions in China.

The company is developing a hybrid-type business model consisting of renting site space in its mall and directly purchasing from other companies. It has grown taking advantage of its distribution network with delivery personnel assigned at 50,000 villages as well as direct sales, and also introduced surprise inspection under its motto, "zero fakes." Accepting an investment from a major Chinese IT firm Tencent in 2014, the company is working on marketing using big data based on SNS and EC data integration and also putting efforts in "Live Distribution" where tenants contribute moving images to introduce and promote their goods.

The company has been selling Japanese cosmetics, health foods and other products to Chinese consumers by opening a site dedicated to Japanese products in its EC site for overseas firms in June 2015, and renting site space to the flagship shop of Rakuten in December of the same year, for example. The company has expanded its business by partnerships with Japanese companies and also puts effort into support for Japanese companies when they open their stores and offer products, and high-speed delivery service with shortened time from order to delivery. In June 2017, it announced a plan to expand its online sale of fresh vegetables by constructing a plant factory in China in business cooperation with Mitsubishi Chemical Holdings. It also plans to start sale of Japanese fresh foods to China in partnership with Yamato Global Logistics, a leading domestic distribution company, by the end of this year. Furthermore, JD.com announced that it would sell VAIO laptops over the Internet as a partner for the re-entry of the brand into Chinese market after its withdrawal from the market. Its business expansion in partnership with Japanese companies is getting further momentum.

(3) Other key foreign-affiliated EC companies

In addition to vip.com and JD.com, various foreign-affiliated EC companies (mostly Asian companies) are providing their service in Japan (Chart 3-3). Taking advantage of characteristics unique to EC, they are increasing services that can contribute to the development of overseas markets by Japanese companies, which include marketing support based on analysis of accumulated transaction data, provision of systems that improve convenience in logistics and payment, and support for expansion to neighboring Asian countries using their overseas networks. Good use of these services will help Japanese companies in securing distribution routes in overseas markets and understanding overseas consumer orientation. These foreign-affiliated EC firms have a potential to develop into an important infrastructure for development of overseas markets by Japanese companies.

Chart 3-3 Recent moves by major foreign-affiliated EC companies in Japan

Name of the company (in alphabetical order)	Parent Country/ Region	Outline (from news reports)
Amazon Japan	US	As part of the "highway for overseas expansion" program (with participation of Nippon Express and trading firms) launched in June 2017, Amazon in partnership with Nippon Express will support Japanese SMEs' export to the US. Nippon Express handles clearance and transportation for goods of multiple companies collectively to reduce distribution cost.
bolome	China	Established a Japanese corporation in April 2015. Integrated operation from purchase to selling of goods through EC dedicated to smartphone. Live relay of videos introducing goods.
eBay Japan	US	Exchanged a memorandum with the Organization for Small & Medium Enterprises and Regional Innovation in April 2017. The company shows SME products on a special site to promote their sales.
Fun Q Japan	China	The subsidiary of Chinese logistics giant SF EXPRESS established in January 2016. The company operates a comprehensive cross-border EC site combining logistics and multiple sales channels.
Inagora	China	Established a Japanese corporation in December 2014. The company operates cross-border EC site specialized in Japanese products, based on one-stop problem solving and targeting the Chinese market.
PChome	Taiwan	Established a Japanese corporation in May 2013. The company operates the biggest B2C shopping site in Taiwan and guarantees delivery within 24 hours.
Tencent Japan	China	In February 2017, Tencent announced its cooperation with the EC Platform of the ANA Group that plans to enter the cross-border EC market. This is a comprehensive partnership consisting of promotion cooperation with its "WeChat," the China's largest SNS service with about 800 million users and its mobile payment service "WeChat Pay."

[Source] Press release of the respective companies, news reports, etc.