

## Formation of New Economies through ICT

Gross Domestic Product (GDP) is an important indicator in looking at the domestic economic activities. GDP can be seen from demand side or supply side. ICT is expected to contribute in both aspects. In this chapter, we will review the role of ICT in society and economy and will concretely examine the contribution path, mainly from the viewpoint of demand focusing on “the market”.

### Section 1 Development of ICT and Expansion of Target Industries

#### 1. ICT as General Purpose Technology

##### (1) What is General Purpose Technology (GPT)?

Core technologies widely used for a variety of applications in the history of human development are called General Purpose Technology.

GPT is classified into 24 technologies starting from “cultivation of plants” and “domestication of animals” which are believed to have started about 10,000 years ago to “nanotechnology” in the 21st century. Among them, “steam engine” from the end of the 18th century to early 19th century, “railway,” “internal combustion engine” and “electric power” from the mid to end of the 19th century and “computer” and “the Internet” in the 20th century are GPTs often mentioned.

##### (2) Potential of ICT

Generally, people agree that ICT is the GPT of our time following the past GPTs such as steam engines and electric power. Personal computers and the Internet have broadly pervaded into society and become infrastructure essential for our economic activities.

Particularly the Internet, one of the last GPTs of the

20th century, had an extremely large impact on society on a worldwide scale. Today the Internet is used in every scene of business and private activities and is truly GPT that is “core technology widely used for a variety of applications.”

Just like past GPTs, ICT can spread as technology with basic and broad impact and lead to the development of new industries.

##### (3) Expansion and Transformation

GPTs bring about a transformation in society and economy, but the transformation is not immediate. It takes time from appearance of the technology to its spread to the entire society and economy.

Generally, the time required from appearance to spread of a technology is becoming shorter in recent years compared with the past, but the speed of development and spread of ICT is spectacular. The government, enterprises and individuals are required to flexibly respond to its changes.

#### 2. Progress of AI/IoT Services

##### (1) Trends of AI/IoT Utilization in Recent Years

Today when utilization of digital data is spreading from cyber space to real space, we are experiencing a progression of IoT where a large number of devices are connected to a network and digital data produced by them are used in a sophisticated manner. In the field of voice recognition and image recognition, the accuracy level fit for practical use is about to be realized through utilization of AI.

For utilization of IoT, attention is paid to the field of mobility driven by self-driving, the field of smart city and smart house, and the field of wellness for healthy life.

In the field of mobility, efforts toward self-driving cars are advancing with entry of players from different industries including IT. Demonstration experiments are also being conducted on alleviation of traffic congestion by optimal control of signals and taxi demand forecast us-

ing AI. Self-driving is expected to alleviate traffic congestion in urban areas and maintain public transportation using circuit buses in the suburbs and rural areas, for example.

In the field of smart city/house, efforts have been made to grasp electricity usage, etc. using ICT toward environment-friendly homes. In particular, smart houses called HEMS (Home Energy Management System) are attracting attention in the context of concern rising over environmental problems.

In the field of wellness, more individuals own terminals including thermometers and blood pressure monitors as wearables. In addition to wrist watch wearables, there are various types including shoes and clothes. Users can grasp the number of steps, blood pressure and quality of sleep, for example. These terminals are attracting attention not only due to rising health con-

siousness but also for employee health management from the enterprise point of view and reduction of medical cost from the social point of view.

The interrelation of these developments is expected to make a difference for the entire society. An example is

creation of a city friendly to the environment and people by fusing congestion alleviation and reduction in traffic accidents and CO<sub>2</sub> emissions through self driving, and energy-efficient smart house and wellness house for healthy life.

## Section 2 Formation of New Economy

### 1. Changes in Business Ecosystem

Let us overview the process of transformation through ICT as a change in a business ecosystem. Business ecosystem refers to a prosperous coexistence through division of labor and collaboration with a large number of players including enterprises and customers.

In the light of the market trend in recent years, we organized starting points of changes in a business ecosystem and relationships of phenomena which are brought about through development of new ICTs (Figure 2-2-1-1).

First, there are three elements that can be the starting point of a change:

The first element is “progress of open architecture.” Open architecture means replacement of a proprietary system with standard specifications or disclosure of its specifications and connection methods. A typical example is Application Programming Interface (API).

The second element is “participation of diverse players.” Market maturity has made it essential to cooperate beyond existing industries. Participation of diverse players in a project, etc. is becoming commonplace. ICT bears a function to facilitate such participation and cooperation.

The third element is “diversification of forms of value for exchange.” There are exchanges of forms of value different from conventional currency value, which include data, things and transactions. New assets and services are produced through the process.

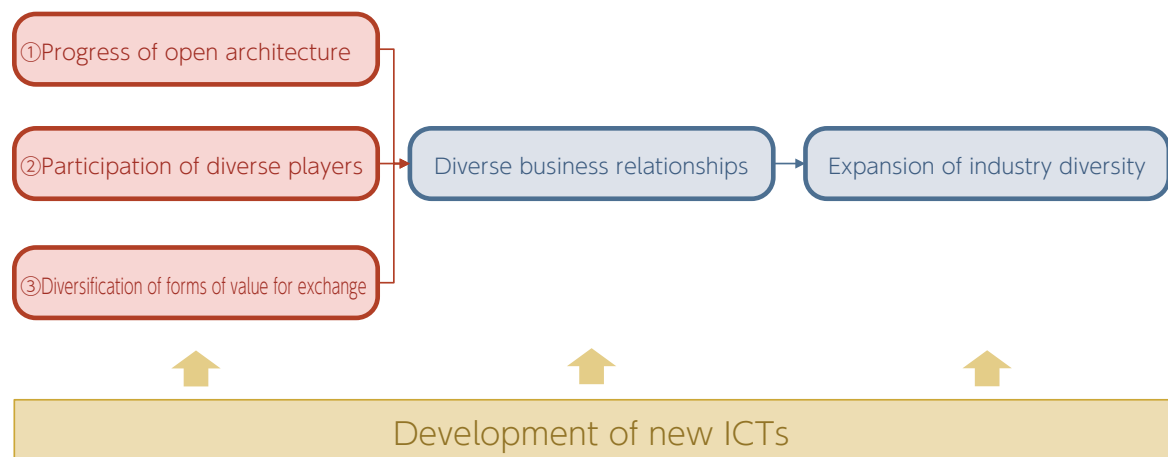
Through combination of the elements above, diverse transaction relationships are emerging through digital platforms that provide various functions, applications and integration. This change is expressed as a relationship between Business and Consumer in Figure 2-2-1-2.

In the past, ICT provided functions mostly involving distribution of money, which included advertising and e-commerce (settlement) and distribution of complementing information. Transactions between companies/industries (BtoB) and between companies and consumers (BtoC) have been developed based on the functions.

Today and in the future, it is expected that new ICTs will support transactions of new forms of value, which will promote BtoB between diverse enterprises and industries and bring about service deployment across industries as well as changes in the value chain structure. Furthermore, consumers' point of view is increasing in importance and consumers are playing role of producers in economic activities. In addition to the direction from business to consumer, the direction from consumer to business (CtoB) is developing mostly in terms of user information. Transaction between consumers (CtoC) is further added to this picture. Interconnection of these forms will build diverse transaction relations.

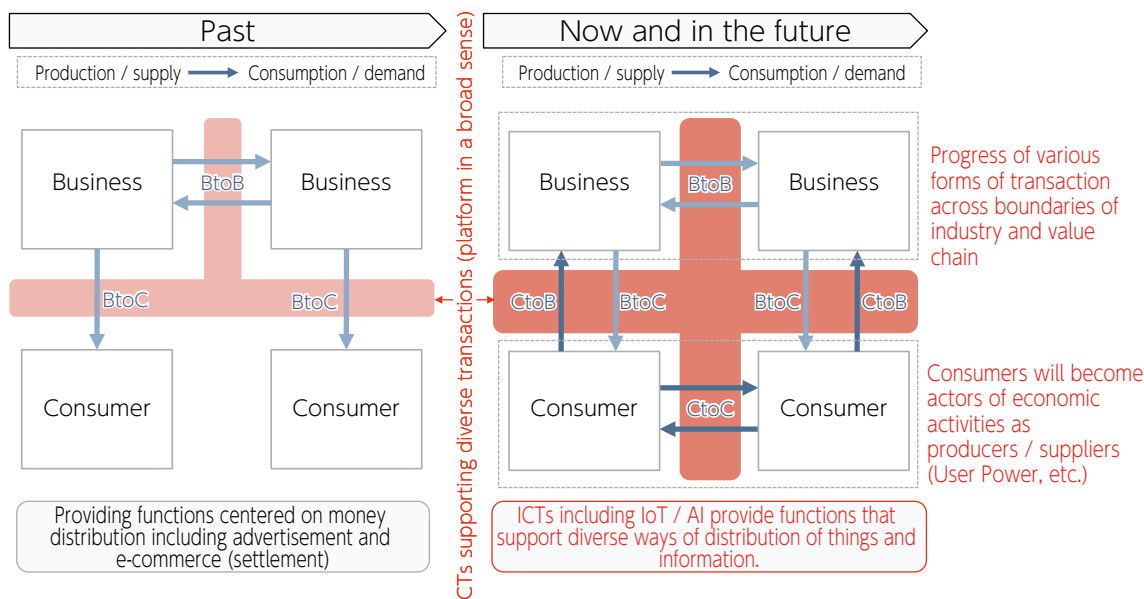
Such relationship building is progressing beyond industry boundaries. Namely, new ICTs and digitalization triggered expansion of industry diversity.

Figure 2-2-1-1 Perspectives of changes of business ecosystem through progress of new ICT



(Source) Survey and Research on Innovation through ICT and Formation of a New Economy, MIC, 2018

Figure 2-2-1-2 Changes of Business ecosystem through progress of new ICT



(Source) Survey and Research on Innovation through ICT and Formation of a New Economy, MIC, 2018

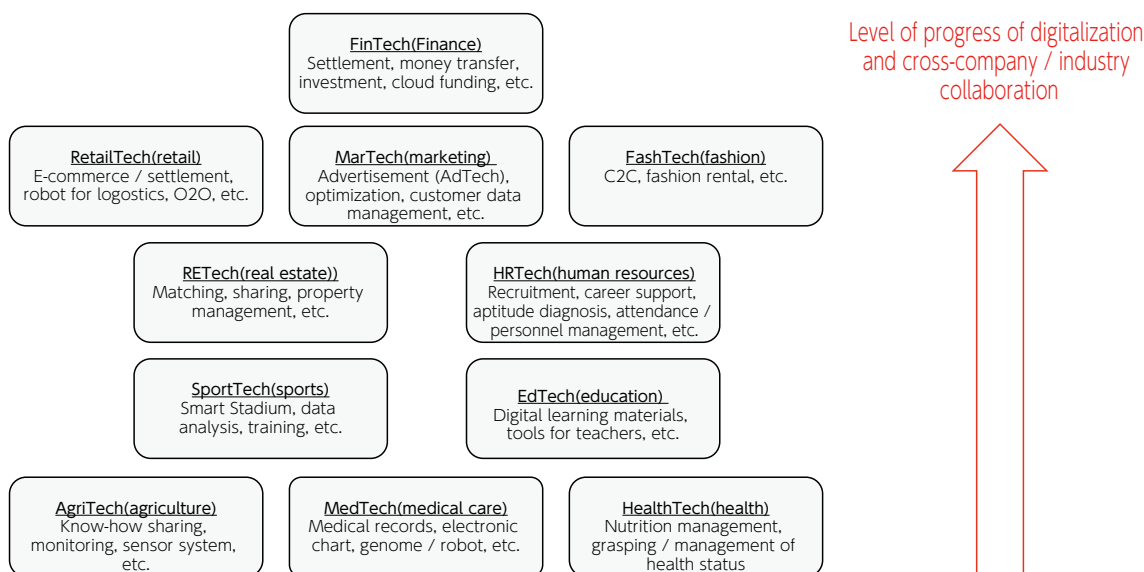
## 2. Expansion of Industry Diversity

In recent years there is a trend to use digital technologies and new ICTs in various industries and businesses. The trend is expressed as “xTechnology” or X-Tech collectively.

There are X-Tech initiatives in various fields (Figure 2-2-2-1). The finance sector, in particular, is working to improve operating efficiency and develop new products/services through utilization of digitalized big data and collaboration. On the other hand, digitalization has not progressed much in the medical sector but efforts for digitalization are accelerating, including electronic medical records and internet reservation systems.

Let us look at the trend of X-Tech progress in these major sectors. Take FinTech for example: various FinTech services for individual customers (BtoC) and corporations (BtoB) have appeared in the fields of conventional financial services. FinTech businesses offer services that are difficult for existing financial institutions to provide but convenient for consumers. Other new services include investment management of enabling small amount of assets and construction of optimum asset portfolios by AI. It is expected that FinTech will contribute to vitalization of asset management in Japan.

Figure 2-2-2-1 Various X-Techs cases



(Source) Survey and Research on Innovation through ICT and Formation of a New Economy, MIC, 2018

## Section 3 Changes in the Market Structure

### 1. Structural Change of the Market

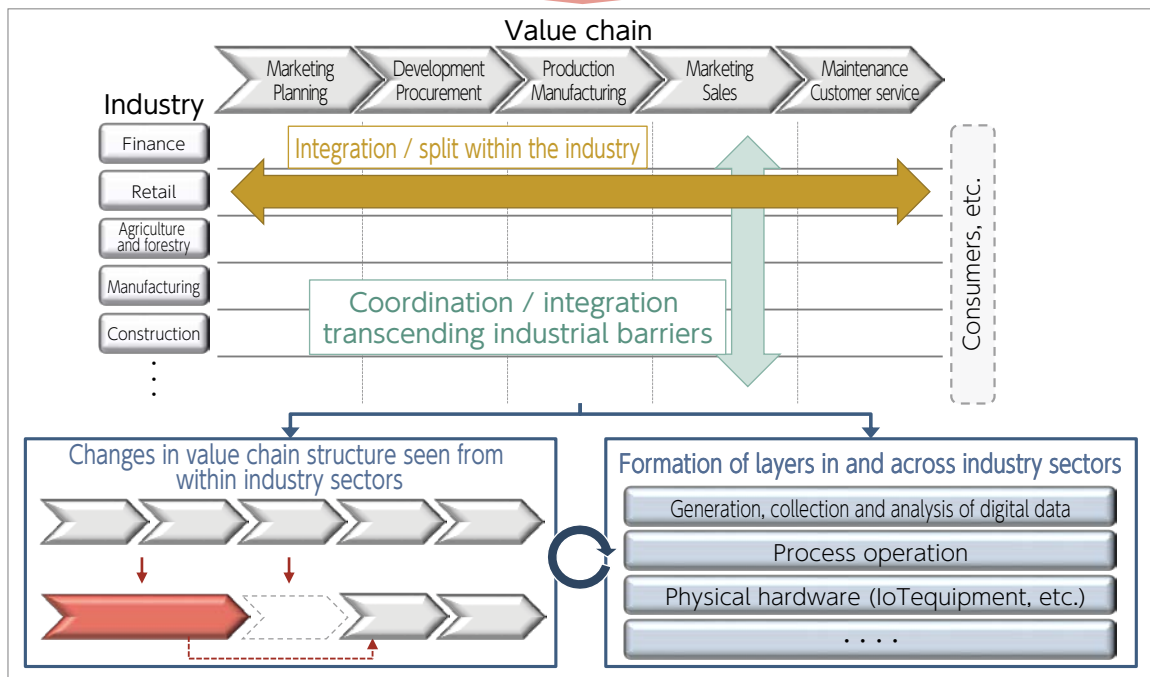
Against the backdrop of the progress of new ICTs, technology-driven transformations are in progress in diverse fields and businesses as seen in X-Tech explained in the section above (Figure 2-3-1-1). Let us organize the trend as a change in market structure from the perspective of the value chain. Generally each industry sector has its value chain consisting of one or more companies. Digitalization described above is making progress in each element that makes up a value chain. This will facilitate visualization/sharing of information to integrate the process from design to production, distribution, sales and maintenance, or conversely, separate value chain components that were linked. On another front, partly because the digital basis does not consider difference in business type, digitalization will facilitate collaboration/integration transcending industrial barriers in specific value chains. One can argue that X-Tech is a

phenomenon of separation and integration of value chain components of diverse industries (finance, retail, etc.) including the ICT industry.

The phenomena have two aspects. One is changes in value chain structure in terms of business category. Namely, some value chain components that have played their roles may be replaced by other methods or operations, or the operations themselves may become unnecessary and lose value. Second is formation of layers within a specific industry sector or across sectors. Layer structure that produces products/services by combining different layers including applications, networks and terminals has rapidly advanced in the ICT sector in the context of modularization and the spread of the Internet. The structure may spread to diverse industry sectors in the future.

Figure 2-3-1-1 Viewpoint of Structural Change of the Market

Progress in generation, collection, and analysis of digital data through new ICT such as AI and IoT



Changes in industrial structures, including shifts in the roles and initiatives of the players, new entries, and creation of new industrial / business models brought about by expanded use of digital data

(Source) Survey and Research on Innovation through ICT and Formation of a New Economy, MIC, 2018

### 2. Formation of ICT Platform

Progress of digitalization will be accelerated by ICT platforms. For an ICT company to provide an ICT platform with transcending industries, it is necessary to en-

sure general versatility, accessibility and provision function so that a large number of companies can use the platform. Some ICT user companies are not only using

ICT but also creating their own ICT platforms and related companies are using them for collaboration. ICT platforms created by ICT user companies are divided broad-

ly into two types: (1) vertical integration ICT platform within an industry and (2) cross-industry ICT platform.

### 3. Changes in Existing Industries/Markets

Provision of ICT platform by ICT user companies is a threat for ICT companies because they might lose business opportunities. However, there is also a move for cooperation between ICT user companies providing a platform and ICT companies. Cooperation is mostly in

the form that users of one platform can use functions of the other. This way the players take advantage of the strengths of the two platforms to retain users, increase users and connected things, while increasing partner companies for development of services on the platforms.

## Section 4 Boosting Demand through ICT

### 1. Platform Formation and Importance of Viewpoint of Consumers

#### (1) Uptaking Consumers' Viewpoint through Platform Formation

Progress of IoT will gather data of people and things that were not connected to the Internet. Collected data are analyzed by AI and the result is reported (visualized) in a form understandable and interpretable to human. The place where data are collected and visualized in the flow described above is called platform (Figure2-4-1-1). On a platform, supply-demand relationships are visualized to enable identification of and response to individual user's needs.

Looking at survey results, the ratio of respondents making efforts to uptake users' point of view is higher for domestic companies advanced in ICT introduction compared with other domestic companies (Figure2-4-1-2).

As regards the content of initiatives to uptake users' point of view, implementation of questionnaire surveys and use of survey results of other companies are chosen by a high percentage of the respondents. By ICT introduction status, companies advanced in ICT introduction seem to be more aggressive about uptaking users' point of view. Companies aggressive about introducing ICT are also aggressive about introducing users' point of view from analysis of User Generated Contents (UGC) of SNS, blogs and other media and analysis of data of sensors, etc. (Figure2-4-1-3). Because companies advanced in ICT introduction are more committed to intro-

duction of user needs and aggressively introducing advanced methods, it is expected that they will work more actively to grasp user needs using platform in the future.

Implementation status of efforts to introduce users' point of view is different depending on ICT introduction state, but there is no significant difference in utilization in users' point of view. Sum of "using effectively but not enough" and "not using effectively" reached 83.0% of all respondents. Utilization of users' point of view is still far from sufficient (Figure2-4-1-4).

We compared the growth rate of sales and operating profit (in past three years) of the respondents aggressively introducing ICT and implementing efforts to introduce user needs with the growth rates of the respondents neither introducing ICT nor making efforts to introduce user needs. The former shows higher growth rate for both finance indicators (Figure2-4-1-5).

Figure 2-4-1-1 Conceptual diagram of platform

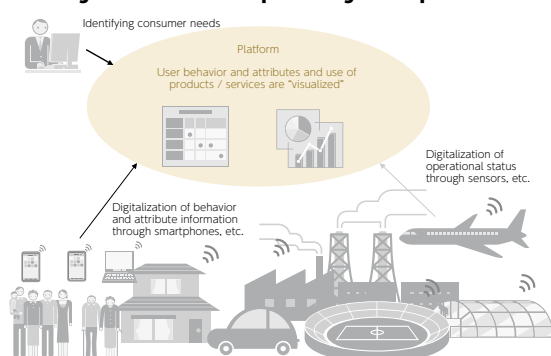


Figure 2-4-1-2 Implementation status of initiatives to uptake users' point of view by ICT introduction status (domestic companies)

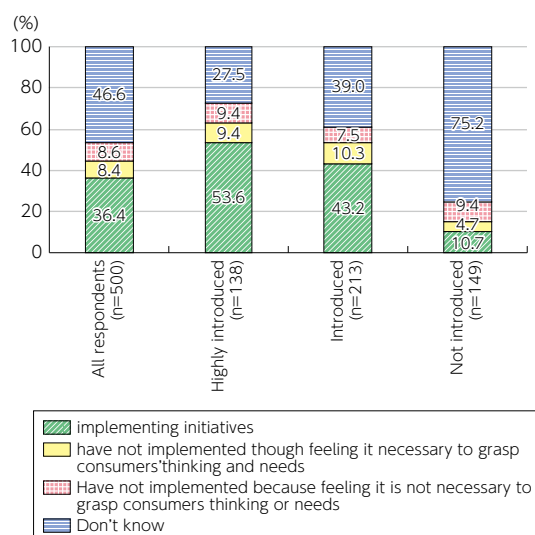




Figure 2-4-1-3 Content of initiatives to uptake users' point of view by ICT introduction status (domestic companies)

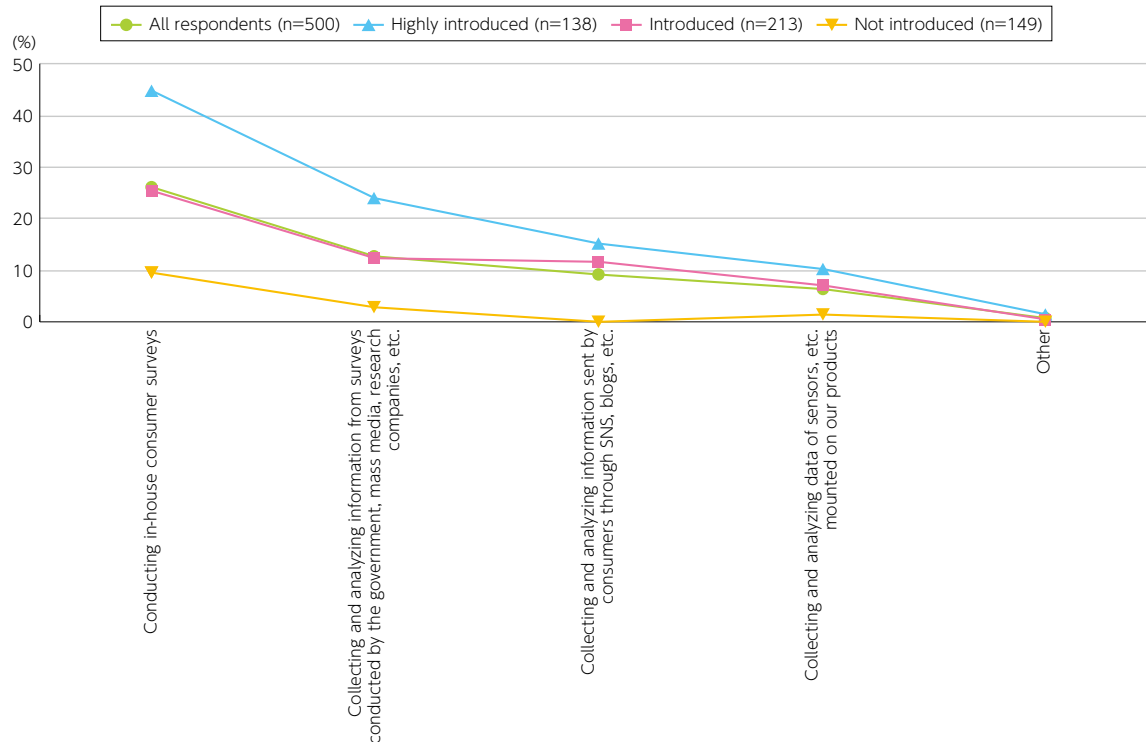


Figure 2-4-1-4 Utilization status of users' point of view by ICT introduction status (domestic companies)

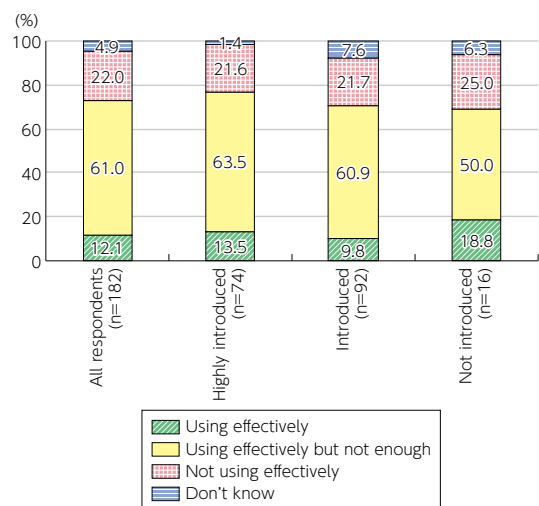
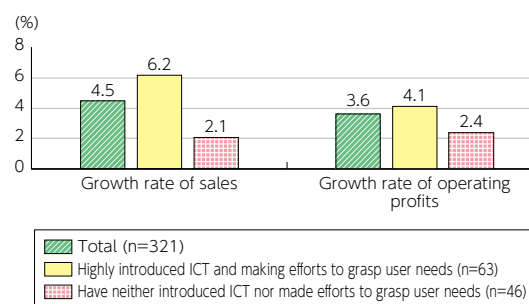


Figure 2-4-1-5 Comparison of sales and operating profits growth rate in the past three years by the status of ICT introduction and of efforts to grasp user needs (domestic companies)



(Source of the five figures above) Survey and Research on Innovation through ICT and Formation of a New Economy, MIC, 2018

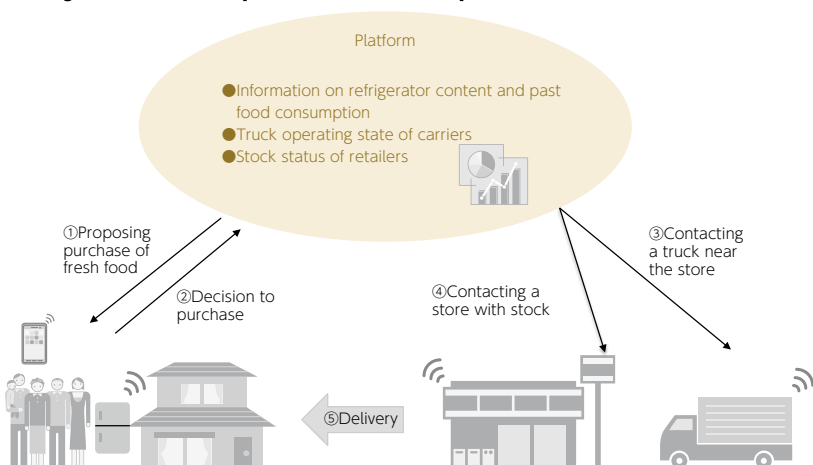
## (2) Cross-sectoral Cooperation to Provide New Products/services based on Consumers' Point of View

In development of products/services based on consumer needs as described above, it may become necessary to develop unprecedented products/services that are difficult for an individual company or industry to offer. This will bring about moves to integrate business activities beyond boundaries of value chain stages or industries and lead to formation of a new ecosystem including cross-sectoral collaboration.

An example of cross-sectoral collaboration in re-

sponse to AI/IoT advancement is smart home. In a smart home, smart home appliances, smart meters, cars and other items of households are connected to the Internet, where AI speakers and smartphones play a central role. It is presumed that accumulation of their data on a platform will advance visualization of needs. There may be a service designed to propose purchase of fresh food based on the stock in the refrigerator and the past consumption trends, and deliver the food purchased by the user within 30 minutes. In this case it is difficult to realize the service only by the home appliance manufacturer that has the data of refrigerator content, but cooperation with retailers and transport businesses will improve its feasibility (Figure 2-4-1-6).

Figure 2-4-1-6 Example of cross-sectoral cooperation in the field of smart home



(Source) Survey and Research on Innovation through ICT and Formation of a New Economy, MIC, 2018

## 2. Challenges for uptaking consumers' point of view

In order to stimulate demand of individual consumers from their own point of view using ICT, analysis based on consumption behavior and attributes of the users is essential.

However, according to MIC, "Communications Usage Trend Survey" in 2017, users who feel at least some degree of concern when using the Internet increased from 61.6% in 2016 survey to 66.8% (Figure 2-4-2-1). Especially 89.5% of them feel concern about leakage of personal information and Internet use history.

With the spread of AI and IoT in the future, opportunities for enterprises to obtain user information including consumption behavior will increase. For collection and utilization of personal information, enterprises should

take measures to eliminate these anxieties of users.

To a question about challenges concerning personal data handling by enterprises, about half of the enterprises answered "incident risk and social responsibility associated with personal data management." This means that we can assume that enterprises recognize the importance of handling of personal data (Figure 2-4-2-2). "Increased cost of personal data collection and management," "shortage of human resources who handle data" and "unclear definition of personal data" are cited by over 20% of the companies.

It is necessary to solve these challenges concerning handling of personal data by enterprises.

With the development of platforms, there is a risk of

Figure 2-4-2-1 Concerns about using the Internet and their contents (multiple responses accepted) (individuals)

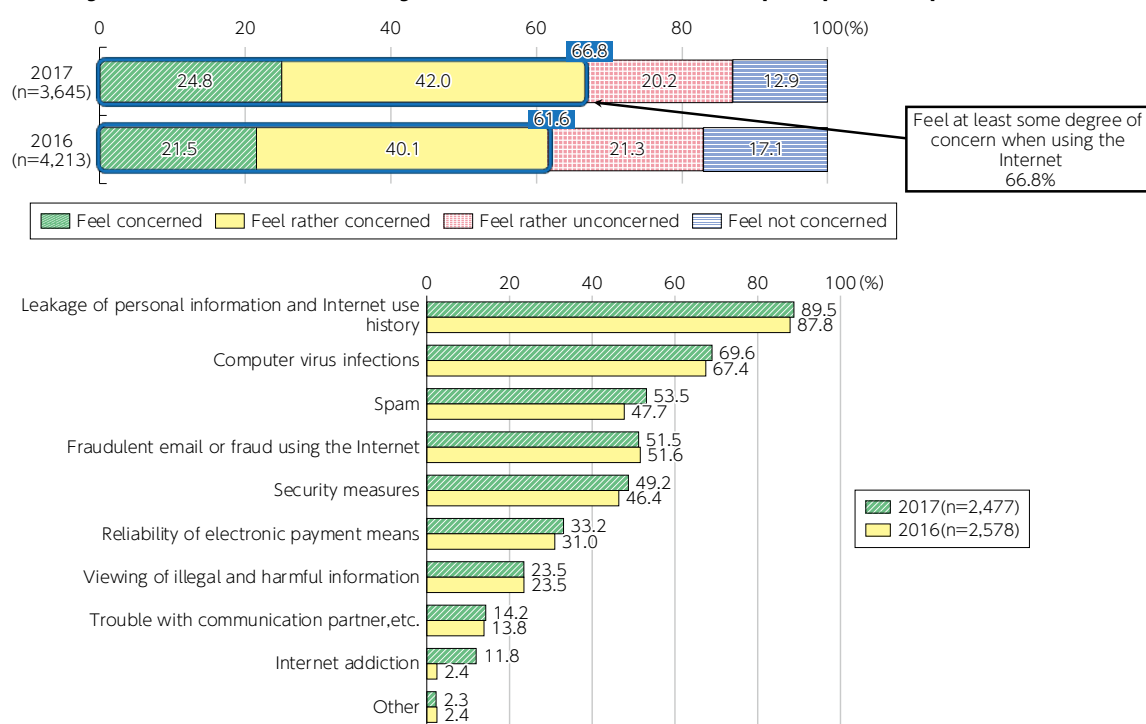
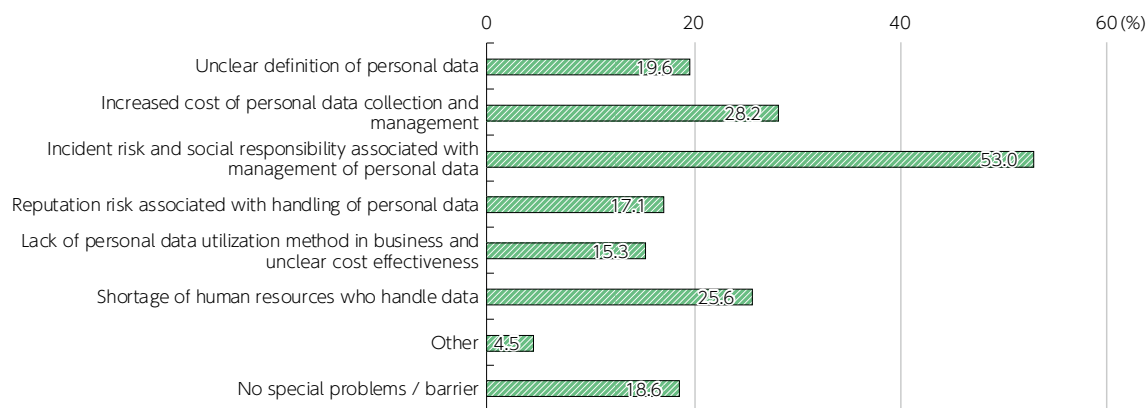


Figure 2-4-2-2 Challenges concerning handling and utilization of personal data (companies)



(Source of the two figures above) Communications Usage Trend Survey in 2017, MIC

oligopoly of data by some platformers, which could prevent appropriate competition and provision of high-quality services to users in the medium- to long-term. If data oligopoly develops due to further data concentration and

domination, it would influence the competitive environment of all sorts of goods/services not only in cyber space but also in the real world.

## Section 5 Potential of Sharing Economy

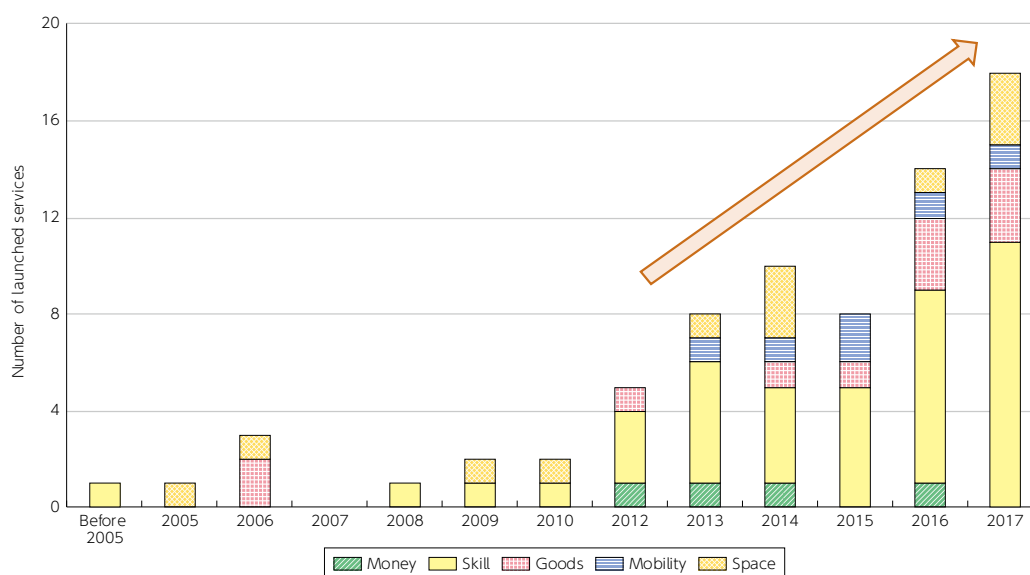
### 1. Overview of Sharing Economy

Progress of ICT represented by AI and IoT has enabled continued grasp of usage status of goods as well as provision of the right to use goods for a certain period of time without selling them. Progress of “visualization” of supply and demand has enabled matching between individuals holding goods/services and individuals who wish to use them, and facilitated individuals’ participation in market as suppliers. In addition, individuals’ awareness is changing from “owning” to “using” goods/services. As a result, sharing is accepted not only for contents but also for tangible things. In this context, new

economic activities called the sharing economy are expanding.

Sharing Economy Association Japan classifies targets of sharing into space, mobility, goods, skill and money. In order to participate in a sharing service of space or mobility as a provider, you need to own assets such as property and car. However ownership of such assets is not necessary for skill sharing, which lowers the barrier for users to participate as a provider. Since 2012, companies launching sharing service has been increasing driven by skill-sharing services (Figure 2-5-1-1).

Figure 2-5-1-1 Change in the number of launched sharing services



(Source) Survey and Research on Innovation through ICT and Formation of a New Economy, MIC, 2018



## 2. Consumer Perception of Sharing Economy

Awareness of the sharing economy is rising in Japan. According to the questionnaire survey of domestic consumers, awareness of sharing service is 31.5% for private lodging (*minpaku*) service, 23.0% for shared parking and 14.2% for ride-sharing. It is clear that sharing economies have come to be known by the public. For private lodging, the Private Lodging Business Act was enacted on June 9<sup>th</sup> 2017 to establish rules concerning businesses providing private lodging service.

Comparing awareness of the sharing economy by country based on the questionnaire survey, we see that while awareness of shared parking is higher in Japan compared with other countries, awareness of other forms of sharing is higher in US, UK and Germany (Figure 2-5-2-1).

Respondents who know sharing services are asked about their usage. The result revealed that overall fewer people have experience using the services in Japan compared with the United States and Europe (Figure 2-5-2-2).

To the question of what should be ensured for use of a sharing service (Figure 2-5-2-3), the largest number of respondents cited a system of guarantee/intervention by the service provider. Sharing service providers are already taking measures to address this issue. Construction of platforms meeting user needs including confirmation of the name and profile of the sharing partners and securing of communication will further spread sharing services in the future.

Figure 2-5-2-1 Awareness of sharing services (international comparison)

Unit: %

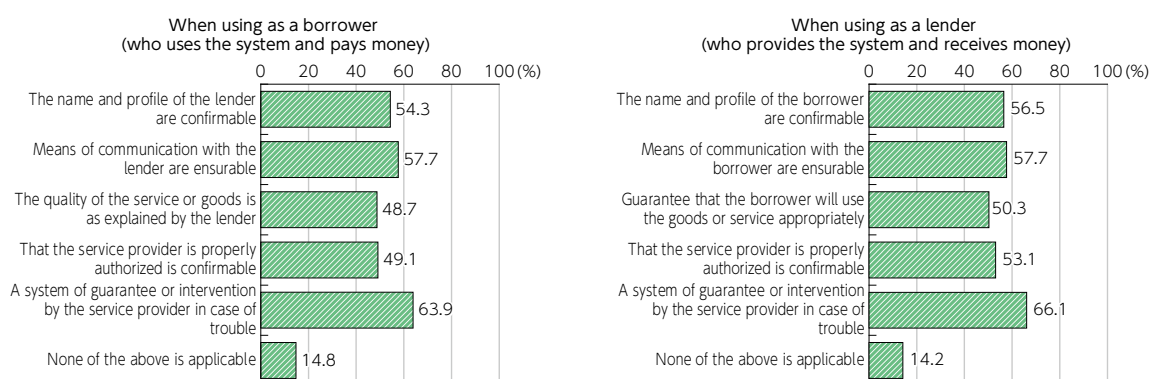
	Shared parking	Ride-sharing	Private lodging service	Sharing of personal work / labor such as housekeeping	Sharing of privately owned things	None is applicable
Japan (n=1,000)	24.2	15.6	32.9	8.5	10.5	57.2
US (n=1,000)	15.1	50.8	35.1	15.4	9.7	34.7
Germany (n=1,000)	18.2	47.4	33.6	7.2	13.2	38.0
UK (n=1,000)	20.0	40.2	36.8	11.5	7.0	41.3

Figure 2-5-2-2 Use experience of sharing service (international comparison) only for people who know sharing service

Unit: %

	Shared parking	Ride-sharing	Private lodging service	Sharing of personal work / labor such as housekeeping	Sharing of privately owned things	None is applicable
Japan (n=1,000)	9.1	4.9	4.9	2.8	1.6	81.1
US (n=1,000)	16.7	36.9	16.2	7.2	7.4	38.7
Germany (n=1,000)	12.3	27.4	17.4	5.2	3.7	48.4
UK (n=1,000)	14.0	22.5	18.2	4.6	2.7	48.7

Figure 2-5-2-3 Conditions for using sharing economy with trust (multiple answers)(Japan)



(Source of the 4 figures above) Survey and Research on Realization of Inclusion through ICT, MIC, 2018

### 3. Economic Effect of Sharing Economy

#### (1) Pathway of Economic Effects of Sharing Economy

Quantitative grasp of effects of sharing economy on economy at large is generally difficult because it includes transaction between consumers and many platform operators that are not listed. Qualitatively effects may be through three pathways: (1) consumption rise caused by elimination of short supply; (2) consumption rise by actualization of latent demand, and; (3) expansion of peripheral businesses (Figure 2-5-3-1).

##### a. Consumption rise caused by elimination of short supply

It is expected that increased supply of products/services for which the demand was clearly known but supply was not sufficient together with matching of supply and demand on a platform will increase consumption. For example, in the lodging industry where demand greatly fluctuates due to the influence of long vacations, events and other factors, it is difficult to secure the supply amount necessary at peak seasons. Private lodging services can respond to increased demand that existing accommodation facilities cannot satisfy. This is expected to increase the number of tourists to the region and their

consumption.

##### b. Consumption rise by actualization of latent demand

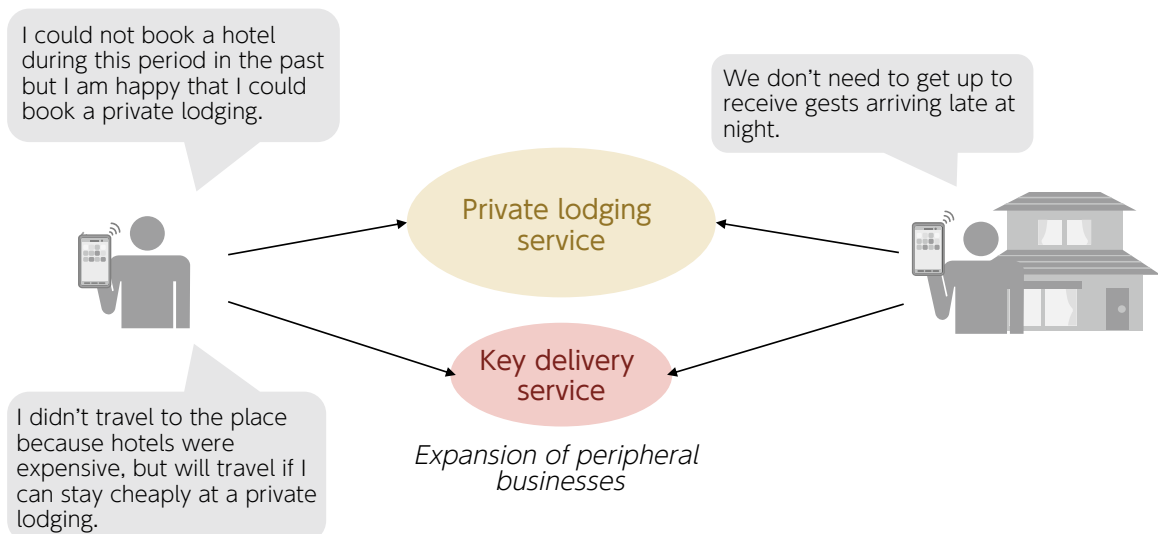
Progress of sharing economy will lower the barrier to obtaining products/services in terms of their price and convenience. As a result, it is expected that demand by latent users who did not use certain products/services considering their price or difficulty to use will be actualized, leading to consumption rise.

##### c. Expansion of peripheral businesses

With the development of sharing economy, it is expected that new businesses will expand to provide new goods and services to businesses providing sharing platforms and platform participants. In the private lodging service, for example, the guest needs to borrow the key from the host. However, direct delivery is difficult if the host lends a vacation house distant from his/her residence, or the guest arrives late at night, for example. This will give rise to a need for a business to keep keys and lend them to guests. Business to renovate properties for private lodging can also expand.

**Figure 2-5-3-1 Image of sharing economy's contribution to economy (example of private lodging service)**

*Consumption rise caused by elimination of short supply*



*Consumption rise by actualization of latent demand*

(Source) Survey and Research on Innovation through ICT and Formation of a New Economy, MIC, 2018

### 4. Changes in Existing Industries and Markets

#### (1) Impact on Existing Industries and Markets

Creation of new markets by development of sharing economy can have a negative impact on the existing markets. In the case of sharing of things, expansion of sharing economy can reduce purchase of new articles. Ride share and private lodging services may influence the taxi industry and the lodging industry.

#### (2) Cooperation with Existing Industries

Development of sharing economy can be a threat to existing businesses but some of them are cooperating with sharing economy businesses because their target users and strengths are different. In Japan, some taxi service providers cooperate with ride-sharing service providers. Because it is difficult for ride-sharing service providers to deploy service on their own in Japan, they

announced they would deepen the partnership with the taxi industry. This is a partnership that benefits both sides because they can provide a service taking advantage of their strengths in that the ride-sharing service providers provide the car dispatch system, that is their strength to the taxi industry. Another example is partnership of financial institutions such as megabanks and local banks with crowdfunding businesses. The business cooperation proposes more suitable funding meth-

ods to companies requesting investment, or decides loan amounts from financial institutions based on the financing record through crowdfunding. In the field of private lodging service, existing accommodation facilities can reach private lodging users around the world through partnership with a private lodging service.

As described above, there are cases of business cooperation where both players of the existing industry and the sharing service providers can utilize their strengths.

## Section 6 Capturing Global Demand

### 1. Need for Capturing Global Demand

In order to make up for the shrinking domestic demand, it is essential to reach out on external demand, namely global demand. We need to tap into the market growth both on the outbound side through exports and overseas expansion, and the inbound side through attraction of foreign travelers with focus on the markets of emerging countries that are expected to grow further.

#### (1) Significance of Overseas Expansion

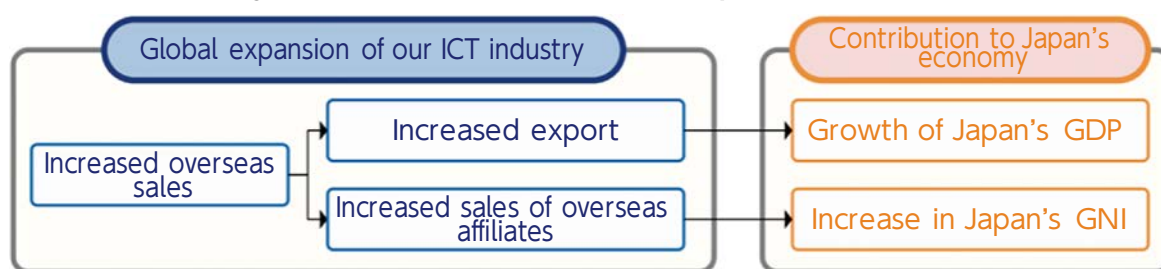
Looking at overseas expansion of our industries in terms of increase in overseas sales, it is possible to achieve it through “export increase” and “sales increase of their overseas affiliates.” “Export increase” directly contributes to GDP growth of Japan. “Sales increase of overseas affiliates”, if it leads to improvement of investment return for Japanese companies, can increase gross national income (GNI) and contribute to increase of substantial wealth of individual citizens (Figure2-6-1-1).

We can grasp economic transactions between coun-

tries/regions from the Balance of Payment. Specifically, international economic activities can be divided into trade (e.g. import/export of products), investment (e.g. dividends from invested overseas companies) and other categories. Income balance that represents the balance of investment is the difference between the receipt of Japan's income generated overseas and the payment of income to foreign countries generated in Japan. A large part of the amount is investment return that is the difference between receipt and payment of values of investment.

From the perspective of balance of payments, the amount that directly contributes to our GDP includes export value (in the case of ICT, exports of terminals, infrastructure equipment, etc.), patent fees pertaining to services, , a part of investment return including dividends from overseas invested companies of foreign direct investment, which flow back to the domestic economy.

Figure 2-6-1-1 Economic contribution of overseas expansion of our industries



(Source) Survey and Research on Innovation through ICT and Formation of a New Economy, MIC, 2018

### 2. State of Export and Overseas Expansion

#### (1) Export of Japan

Looking at the trade and service balance of Japan, trade deficit continued after the Great East Japan Earthquake but turned to surplus in FY 2016. This is attributed to the factors to record the highest exports to Asia and to decrease imports due to lower oil prices and yen appreciation, and other factors. Primary income balance that mainly consists of interest, dividends and other rev-

enues generated by overseas assets decreased for three successive years from the peak in 2007, but has been expanding due to increase in receipt of investment returns since 2011 and exceeded 20 trillion yen in 2015. This way, there is a structural change from trade and service balance to income balance in recent years. It is therefore crucially important to continue to promote overseas investment.

## (2) State of Foreign Direct Investment

Companies' activities toward globalization can be traced in changes in foreign direct investment. Foreign direct investment activities include establishment of overseas bases and equity participation in foreign companies. Another approach to capture capital is M&A (corporate merger & acquisition).

The amount of M&As by Japanese ICT companies is increasing in the last four years, which have changed their ratio to the total amount of M&As by ICT companies worldwide. In 2016, M&A amount of Japanese ICT companies dramatically increased to 36.7 billion dollars, which includes the acquisition of ARM, a leading semiconductor design company of the UK by the SoftBank Group (Figure2-6-2-1).

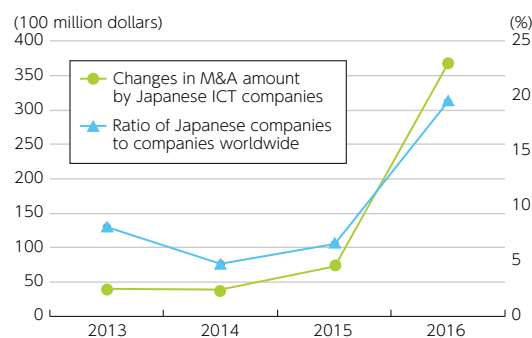
## (3) Companies' Intention of Overseas Expansion

The trend of possible means of overseas expansion by domestic companies based on the questionnaire survey results are identified (Figure2-6-2-2). Overall, direct investment (in the same industry sector) has the highest percentage, which was followed by "business alliance" and "direct investment (in different industry sector)." By industry sector, the rate of "business alliance" is high and the rate of "direct investment (in the same industry sector)" is relatively high for ICT companies. "Business alliance" can be an alliance with a company outside the industry, or an alliance with a company of the same industry, but the latter may lead to entry into a different industry. ICT companies may be more inclined to do business with companies in different industries compared with companies of other industries.

## (4) Public-Private Initiatives: Infrastructure Export

There is a huge infrastructure demand in the world, especially in emerging countries. Further expansion of the market is expected in the future. It is crucially im-

**Figure 2-6-2-1 Changes in the amount of M&As by Japan's ICT companies**



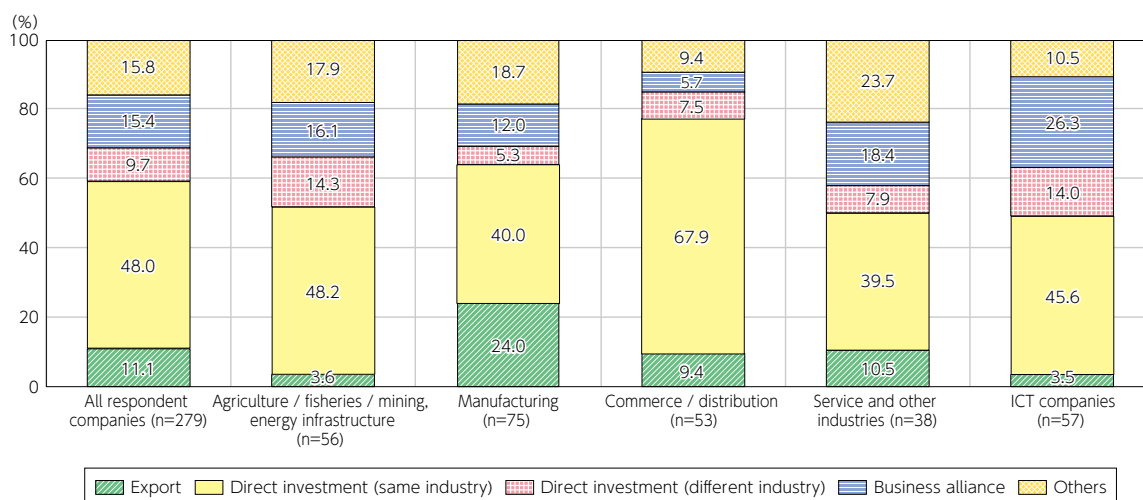
(Source) International IoT competitiveness index, MIC, 2018

portant to aggressively capture demand in the world by maximizing Japan's "technologies and knowhow with strengths" toward robust economic growth of our country. It is also important to promote development of diverse businesses by our companies, which include not only export of "equipment" but also getting orders for systems covering infrastructure design, construction, operation and management, and expansion of local "business investment."

In this context, Japan has been making strategic public-private efforts for overseas expansion of infrastructure systems in a variety of fields. In "the Infrastructure Export Strategy"<sup>9</sup> the government set a goal for Japanese companies to get orders for infrastructure systems to the amount of about 30 trillion yen<sup>10</sup> in 2020. Toward attainment of the goal, the government is aggressively promoting overseas expansion of major industries or priority fields including electric power, railroad, information communication, medical care, space, port and harbor and airport.

As regards infrastructure export in the information

**Figure 2-6-2-2 Companies' means of overseas expansion (questionnaire survey result; the means to be used frequently)**



(Source) Survey and Research on Innovation through ICT and Formation of a New Economy, MIC, 2018

<sup>9</sup> Decided in May 2013 (revised in May 2017)

<sup>10</sup> Including income from business investments

communication sector, in particular, with the continuing global expansion of the market and development of IoT, Big Data, AI and other new technologies and services, demand for large-capacity information communication infrastructure to support them and various systems using the infrastructure is expected to increase worldwide. It is important to actively capture the demand.

Also based on the Overseas Expansion Strategy for the information communication sector (formulated on October 31, 2017) MIC is promoting overseas expansion of our ICT in packages covering hard infrastructure including submarine cable, broadcasting systems (terrestrial digital, etc.), development of broadband networks and postal systems as well as soft infrastructure includ-

ing security/safety systems (biometric systems, etc.), disaster prevention ICT and medical care ICT.

For export of infrastructure of various sectors including public transportation, urban development, roads/bridges and energy, increasing added value of the infrastructure is expected through collaboration with our advanced ICT industry with applied skills. In particular, we can dramatically increase added value of infrastructure by realizing the potentials of AI and IoT ahead of the rest of the world. For example, application of AI/IoT to sectors where ICT is not yet sufficiently used (agriculture, education, medical care, etc.) abroad can bring about a breakthrough there.

### 3. Increasing Inbound Demand

#### (1) State of Inbound

The number of foreign visitors to Japan increased rapidly in recent years. Last year, the number reached 28.69 million and their consumption amount expanded to 4 trillion 416.2 billion yen. Tourism has been growing into an industry that supports Japan's economy. In March 2016 when the number was approaching the goal of 20 million, the "Council for the Development of a Tourism Vision to Support the Future of Japan" chaired by the Prime Minister set a new goal of 40 million foreign visitors to Japan with them spending 8 trillion yen by 2020 and compiled policy measures for the realization of the goal in the "Tourism Vision to Support the Future of Japan" ("Tourism Vision").

#### (2) Improvement of the Environment for Accepting Visitors

With the increase of foreign visitors to Japan, there is a pressing need to improve the environment for accepting travelers in Japan. The government is promoting measures for creating an environment for travelers to fully enjoy stress-free and comfortable sightseeing. In particular, efforts for drastic improvement of "soft infrastructure" may include: promotion of development of a free public wireless LAN environment ("free Wi-Fi environment") and simplification of the procedure for using free Wi-Fi; complementary use of SIM cards / mobile Wi-Fi routers; multilingual speech translation systems, and implementation of platforms for optimal service provision covering distribution of tourism information tailored to personal needs.

MIC in cooperation with the Japan Tourism Agency set up "the Free Public Wireless LAN Development Promotion Conference" consisting of local governments and private businesses in the communication, transportation and other sectors in 2014. The conference is working on promotion and publicity of development of free Wi-Fi and other initiatives. Communication during travelers' stay in Japan and multilingual support for this purpose continue to be challenges. As more foreign visitors to Japan are expected to choose individual travel plans, there will be more scenes involving complicated communication. It is desirable to utilize ICT including multilingual speech translation system using VoiceTra tech-

nology, multilingual outdoor digital signage and a variety of applications.

It is also important to improve the environment of settlement, including payment. If the familiar cashless environment that spread in their countries became available also in Japan through improvement of electronic clearing services, their convenience would be drastically improved, leading to further stimulation of consumption.

In this context, the Tourism Vision sets a goal of drastic improvement of the cashless environment by: "100% acceptance of credit card payment" in tourist spots and "making all mobile card payment terminals IC compatible"; request for significant acceleration of the schedule of the majority of installation plans of the ATMs of the three mega banks, enabling the acceptance of credit cards issued in foreign countries (installation within 2018).

This way, improvement of the environment for acceptance using ICT both in information and settlement aspects will lead to overall improvement of services and satisfaction and increase new and repeated visitors, which is important for continuing capturing of the inbound demand.

#### (3) Utilization of Soft Power

For expansion of inbound demand, in addition to the improvement of the environment to accept visitors, it is critically important to continuously encourage visits to Japan by raising awareness and interest in Japan. For this purpose, it is essential to strengthen information transmission to the world by taking advantage of Japan's soft power. The government is making public-private efforts to transmit Japan's appeal using broadcast contents.

Broadcast contents attract attention as concrete means to convey the attraction of Japan. As travel information sources they had used before they departed to Japan and found them useful in Japan, foreign visitors cited various official websites, SNS and "television programs," which reveals that broadcast contents are important information source.

This way, overseas expansion of broadcast contents is



expected, beyond export of broadcast programs, to produce economic ripple effects including increase in foreign tourists to Japan by providing information on Japan

through broadcast programs and to expand the market for local products.