Section 2
ICT and Competitiveness

1. International Competitiveness of ICT Industry

(1) Globalization of ICT networks

A. Trends concerning global business development by the world's major telecommunications carriers

The current state of the global business development by the world's major telecommunications carriers reveals that they are actively promoting global expansion by establishing local subsidiaries and through investment in local telecommunications carriers **(Graph1-17)**.

B. Efforts at home and abroad for the construction and diffusion of next-generation network

Efforts are being made for the construction of next-generation networks in such fields as NGN, wireless communications, digital broadcasting, and network convergence, with various countries participating. And in the field of NGN, standardizing bodies in Asia and Europe and United States are working on global standardization of NGN under ITU-T **(Graph 1-18)**. Development of mobile phone systems standardization following the 3G (third-generation) is in progress, and in terrestrial digital broadcasting, the three standards: of Japan, Europe and the United States have been adopted in the world.

C. Progress in offshoring through global networks

(a) Background of expanding offshoring

Due to the advancement of global networks and the

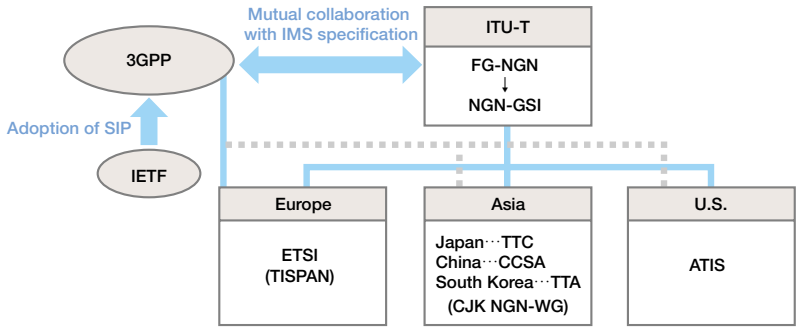
Graph 1-17 Status of Overseas Business Development by Major Telecom Carriers Abroad (As of the end of FY2006)

Country	Telecom carrier	Business		Country where business is being operated											
				Asia				America		Europe					
		Fixed communications	Mobile communications	Japan	China	South Korea	Others	U.S	Others	Germany	France	U.K.	Spain	Italy	Others
Japan	NTT	●	●	◎		△	△	○							
	KDDI	●	●	◎		△	△		○						△
	Softbank	●	●	◎											
Americas	AT&T Inc.	●	●	○	○	○	○	◎	○	○	○	○	○	○	○
	Verizon	●	●	○		○	○	◎	○	○	○	○	○	○	○
	Sprint Nextel		●	○		○	○	◎	○	○	○	○	○	○	○
France	FT	●	●								◎	○	○		○
U.K.	Vodafone		●		△		○	△		○	△	◎	○	○	○
	BT	●		○	○	○	○	○	○	○	○	◎	○	○	○
Spain	Telefonica	●	●		△				○	○		○	◎	△	○
South Korea	KT	●	●			◎	△								○

* "◎": Headquarters; "○": Local telecom subsidiary (Equity stake of more than 50%); "△": Partial investment in local telecom operator (equity stake of more than 1%)

(Source) Compiled based on interviews

Graph 1-18 System to Study the International Standardization of NGN



(Source) "Surveillance Study on the Current Status of Ubiquitous Network Society"

remarkable growth of software-service industries in China and India, the offshore development of software has been progressing rapidly. From the perspective of the development of international communication networks, large-capacity submarine cables have been laid around Japan, extending to China, Southeast Asian countries and even to the western part of India, lowering the charge per capacity **(Graph 1-19)**. Moreover, the size of software-service industries in China and India, the countries that are drawing attention as offshore partners have expanded from 9.7 billion dollars in 2001 to 60.2 billion dollars in 2006 and from 9.5 billion dollars to 37.4 billion dollars, respectively **(Graph 1-20)**.

(b) Outlook of Japan's offshore development and comparison of characteristics of offshore development between Japan and the U.S.

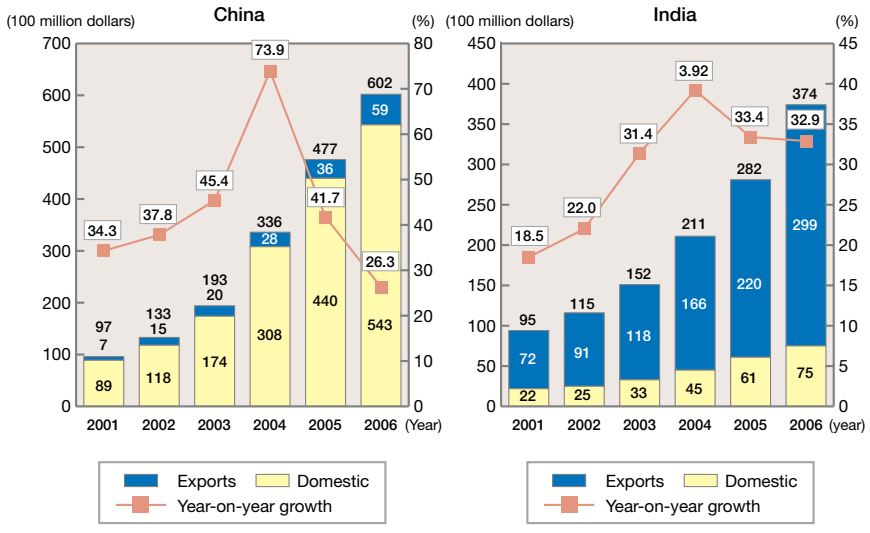
According to surveys, the size of Japan's offshore development, which stood at 63.6 billion yen in 2005, is expected to increase to about 200 billion yen in 2010 **(Graph 1-21)**. One of the major purposes of the advancement of offshore development is to complement the shortage of software engineers in Japan. Therefore, as long as increases in the size of software development continue to exceed increases in the size of offshore development, expanding offshore development will not result in decreasing domestic employment **(Graph 1-22)**.

A comparison of Japan and the United States with regard to the main offshoring destination countries, that of Japan is China (about 80%), and that of the United States is India (about 95%) **(Graph 1-23)**. As to the criteria for selecting companies to which they commission offshore development, Japan attaches importance to language and cost reduction, while the United States places emphasis on technical capabilities of engineers and their performance **(Graph 1-24)**.

Graph 1-19 International Undersea Cable Around Japan

(Source) KDDI

Graph 1-20 Changes in the Sales of Software-Service Industries in China and India



(Source for China) China Software Industry Association
(Source for India) Ministry of Communications & Information Technology

(2) Status of international competitiveness of Japanese ICT industry

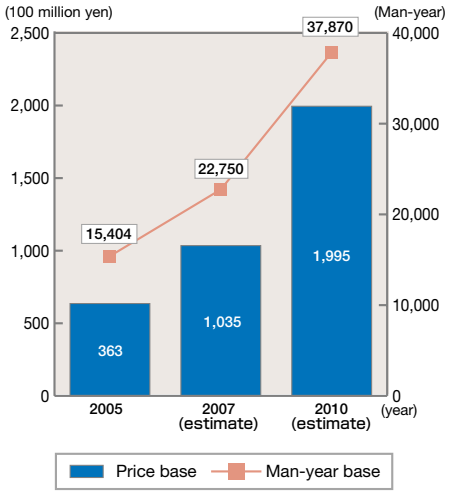
A. Profit rate of the world's ICT vendors

The average operating profit rate of major Japanese ICT vendors in the past 10 years is lower than those of their counterparts in the U.S., Europe and South Korea in all of the following fields: terminals and equipment, devices, and software solution. The gap is particularly wide in the fields of devices and software solution **(Graph 1-25)**.

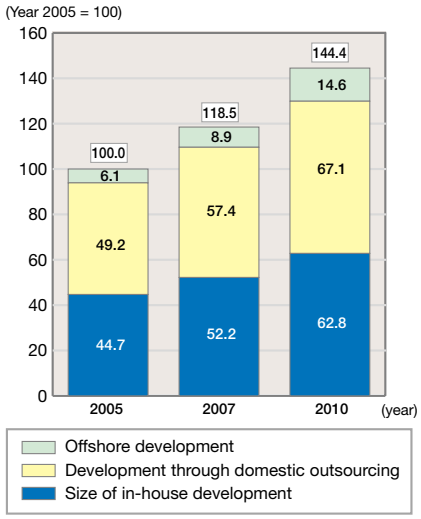
B. International comparison of the competitiveness of ICT industries

From 1997 to 2005, Japan saw its global market share and exports share decline in almost all products, indicating that Japanese business competitiveness and location competitiveness as a production base have eroded. On the other hand, the United States, though its location competitiveness declined, has maintained its business competitiveness, suggesting that the country has been shifting its production base to other countries.

Graph 1-21 Size of Japan's Offshore Development

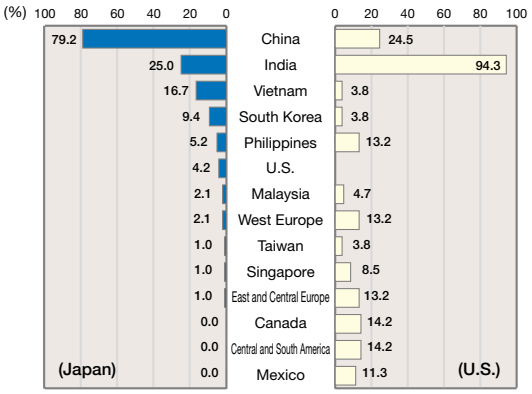


Graph 1-22 Size of Japan's Software Development by Type

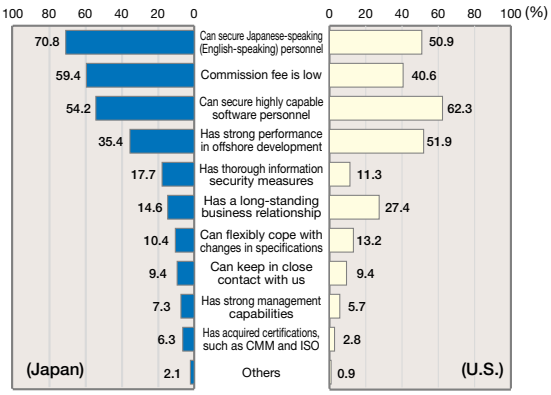


(Source for graphs 1-21 and 1-22) "Survey Research on the Advancement of Offshoring and its Impact"

Graph 1-23 Countries or Areas to Which Japan and U.S. Commission Offshore Development



Graph 1-24 Bases of Selection for Offshore Development



(Source for graphs 1-23 and 1-24) "Survey Research on the Advancement of Offshoring and its Impact"

Graph 1-25 Average Operating Profit Ratio of Major Information Vendors by Country

	Total	Business field		
		Terminal and machine	Device	Software / solution
Japan	4.1%	4.7%	2.5%	5.6%
U.S.	13.0%	7.2%	20.2%	19.6%
Europe	7.2%	7.1%	4.7%	13.0%
South Korea	12.3%	8.4%	22.9%	—

(Source) Compiled from vendors' financial statements

China, for its part, has rapidly increased its location competitiveness due to the foreign vendors' moves to concentrate their production bases by the development of the international division of labor **(Graph 1-26)**.

(3) International competitiveness of Japanese ICT industry as seen from competitive factors

A. Business development of Japanese vendors

In recent years, the weight of the Japanese market for communications-related equipment, such as personal computers and mobile phones, and digital video equipment, such as LCD TVs and plasma TVs, has been on a declining trend in the world **(Graph 1-27)**. Nevertheless, Japanese vendors are more domestic market-oriented than their counterparts in Europe and the United States **(Graph 1-28)**.

A comparison of the product structure of major vendors in various countries shows that Japanese vendors tend to deal in a wider range of products than their coun-

Graph 1-26 Changes in the Market Shares and Exports of Main ICT Machines and Devices Exports1997 (some in 1999)

Japan

year 1997(some in 1999)

World market share	Less than 15%	15~30%	More than 30%
More than 50%		Liquid crystal panel	DVD player Digital camera
25~50%	Cathode ray tube TV Mobile phone	Liquid crystal panel Laptop	
10~25%	Server	HDD	
Less than 10%	Desktop computer Router		

Export share

U.S

World market share	Less than 15%	15~30%	More than 30%
More than 50%		Server HDD	Router
25~50%	Laptop	Desktop computer Mobile phone Semiconductor	
10~25%			
Less than 10%	Cathode ray tube TV DVD player Digital camera	Liquid crystal panel	

Export share

China

World market share	Less than 15%	15~30%	More than 30%
More than 50%			
25~50%			
10~25%			
Less than 10%	Desktop computer / Laptop Server / Mobile phone Cathode ray tube TV / HDD DVD player / Router Digital camera / Semiconductor	Liquid crystal panel	

Export share

year 2005

World market share	Less than 15%	15~30%	More than 30%
More than 50%			Digital camera
25~50%	Laptop Cathode ray tube TV HDD		
10~25%	DVD player Semiconductor Liquid crystal panel Mobile phone		
Less than 10%	Desktop computer Server Router		

Export share

World market share	Less than 15%	15~30%	More than 30%
More than 50%	Server Router HDD		
25~50%	Desktop computer Laptop	Semiconductor	
10~25%	Mobile phone		
Less than 10%	Cathode ray tube TV DVD player Digital camera Liquid crystal panel		

Export share

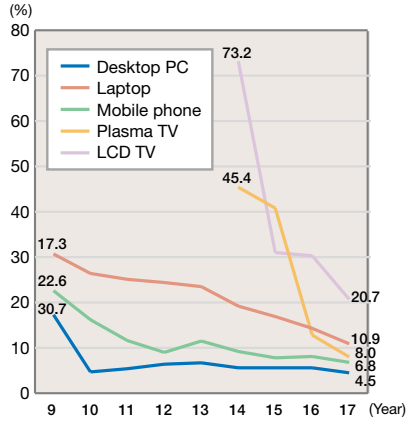
World market share	Less than 15%	15~30%	More than 30%
More than 50%			
25~50%		Cathode ray tube TV	DVD player
10~25%			Laptop
Less than 10%	Server	Mobile phone HDD Semiconductor	Desktop computer Router Digital camera Liquid crystal panel

Export share

* Export share is the ratio of each country's exports to total exports by the world's major countries.

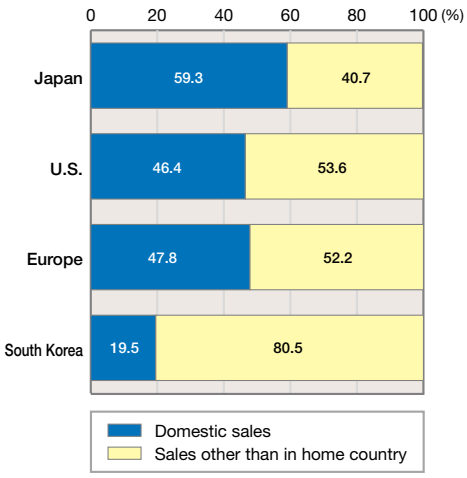
(Source) Compiled from research firms' materials

Graph 1-27 Weight of the Japanese Market in the World Market



(Source) Compiled from Fuji Chimera Research Institute materials

Graph 1-28 Domestic Sales Ratio of Japanese and Overseas Vendors



(Source) Compiled from vendors' financial statements

terparts in Europe and the United States **(Graph 1-29)**. While this tendency has advantages in that it makes diversification of risk and accumulation of a broad range of technology possible, it also has demerits in that it is difficult to seek economies of scale, as the size of each business division tends to be small, and that it drags on decision making due to the large adjustment costs involved.

B. Technical capabilities of Japanese vendors

A survey of Japanese professional engineers concerning technical capabilities shows that Japanese or U.S. technical capabilities have received high marks in almost all products **(Graph 1-30)**. The survey also shows that Japanese vendors have a technological edge in products requiring material technology, optical/electronic device technology, equipment technology and metal dies technology, and that American vendors have advantages in system configuration technology and communication technology **(Graph 1-31)**. In addition, Japanese vendors are good at producing products which have many important elemental technologies to conbine.

Graph 1-29 Status of Main ICT-Related Business Operations by Major ICT Vendors (As of the end of FY2006)

Company \ Product		Communications-related equipment						Visual equipment						Device				Software/Solution	
		Desktop PC	Laptop	Server	Router	Switch	Mobile phone	Cathode ray tube TV	Liquid crystal TV	Plasma TV	DVD player/recorder	Digital camera	Printer	Copier/complex machine	HDD	Semiconductor	Liquid crystal panel	Plasma panel	package System	architecture
Japan	Hitachi	○	○	○	○	○	○	○	○	○	○	○			○	○	○	○	○	○
	Matsushita		○		○		○	○	○	○	○	○	○	○		○	○	○	○	○
	Sony	○	○	○			△	○	○		○	○	○			○	△			○
	Toshiba	○	○	○	○	○	○		○		○	○	○	○	○	○	○		○	○
	NEC	○	○	○	○	○	○						○	○		○	○	○	○	○
	Fujitsu	○	○	○	○	○	○		△	△			○		○	○		△	○	○
	Canon											○	○	○					○	○
	Mitsubishi Electric	○	○	○		○	○	○	○		○		○			○	○		○	○
	Sharp	○	○				○	○	○		○		○	○		○	○		○	○
	Sanyo Electric						○	○	○	○	○	○				○				
	Ricoh											○	○	○		○			○	○
	Seiko Epson	○	○	○					○			○	○	○		○	○		○	○
	Kyocera						○						○	○			○		○	○
U.S.	IBM			○									△			○			○	○
	Hewlett Packard	○	○	○	○	○			○	○		○	○	○					○	○
	Dell	○	○	○		○			○				○							○
	Microsoft																		○	
	Intel															○				
	Motorola			○	○		○												○	○
	Cisco Systems			○	○	○													○	○
	EDS																			○
	Xerox												○	○		○			○	○
	CSC																		○	○
	Oracle																		○	○
	Kodak											○	○							
	Apple	○	○	○			○												○	△
	Texas Instruments															○				
	San Microsystems	○	○	○		○													○	○
	EMC																		○	○
	Seagate Technology														○					
Europe	Siemens (Germany)	△	△	△		○			△										△	○
	Alcatel-Lucent (France)				○	○	○												○	○
	Ericsson (Sweden)			○	○	○	○												○	○
	Nokia (Finland)						○												○	
	Philips (Netherlands)						△		○	○	○					△	△			
	Infineon (Germany)															○				
	ST Microelectronics (Italy, France)															○				
	SAP (Germany)																		○	○
	Capgemini (Germany)																			○
South Korea	Samsung Electronics	○	○	○			○	○	○	○	○		○	○	○	○	○	○		
	LG Electronics	○	○				○	○	○	○	○						△	○	△	△

* "○"designates business operations through a consolidated company. "△"designates business operations through a non-consolidated company.

* System architecture includes only those that require additional charges separate from hardware, software and their incidental services.

(Source) Compiled based on interviews

C. R&D and human resources in the ICT field

A comparison of the ratio of R&D spending to sales at major ICT vendors in Japan and other countries show that the R&D spending ratio of Japan is lower than that of the U.S. and European countries **(Graph 1-32)**. That of South Korea has been drastically increasing in recent years and almost the same level as that of Japan in FY2005. Moreover, the number of Japanese college graduates majoring in ICT-related subjects has remained flat in recent years, while the number of graduates majoring in similar subjects is on the increase in the United States, China and India, resulting in Japan falling behind other countries in terms of human resources as well **(Graph 1-33)**.

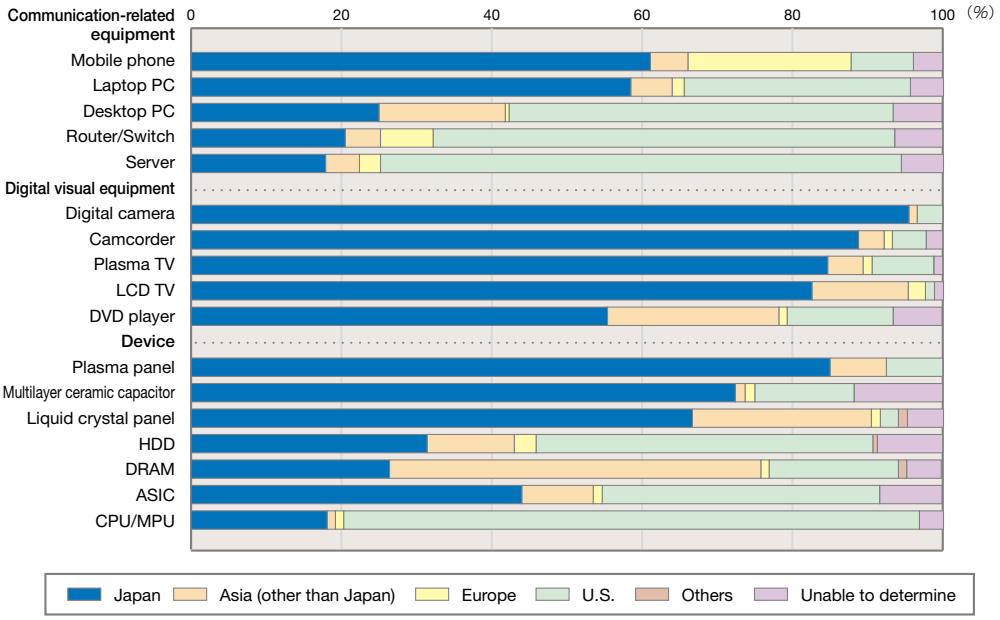
(4) Status of international competitiveness in each product

A. Network equipment (router/switch)

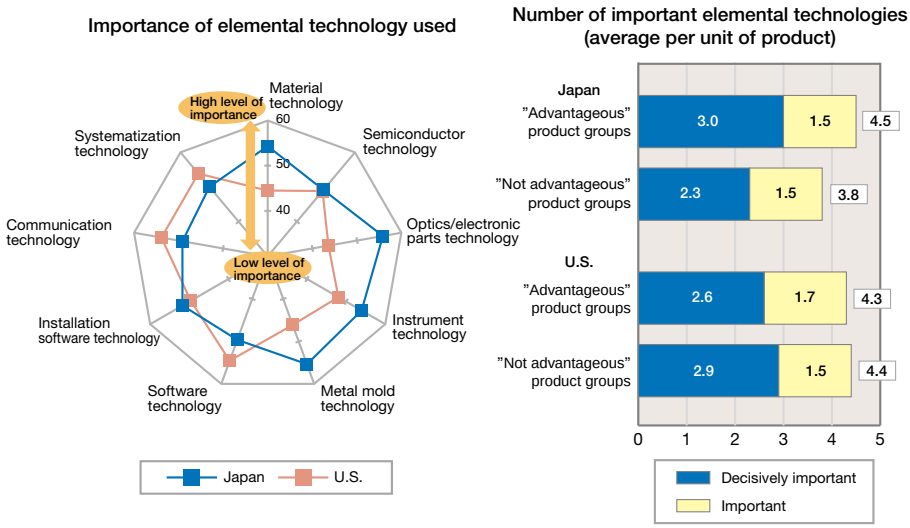
Among the network equipments that are expected to play an essential role in the establishment of next-generation networks are routers and switches. However, Japanese vendors' share of the world market for the two equipments is extremely small, with a dominant share held by North America. **(Graph 1-34 and 1-35)**.

In the future, the the demand for high-end products

Graph 1-30 Technological Capability of Each Country to Produce Main ICT-Related Products (areas of strongest advantage)

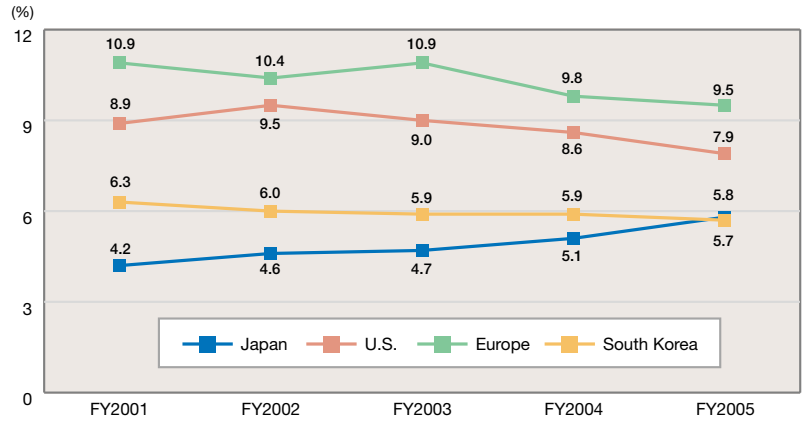


Graph 1-31 Comparison of Technical Features of Product Groups in which Japanese, U.S. or European Countries Have Technical Capabilities



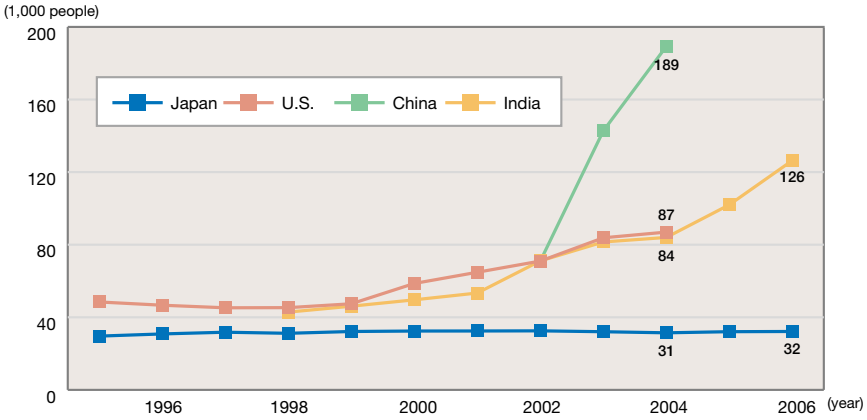
(Source for graphs 1-30 and 1-31) "Survey Research Concerning Elemental Technology in Major Japanese Products/Parts in the ICT Field"

Graph 1-32 Average Ratio of R&D Spending to Sales at Major ICT Vendors in Japan and Other Countries



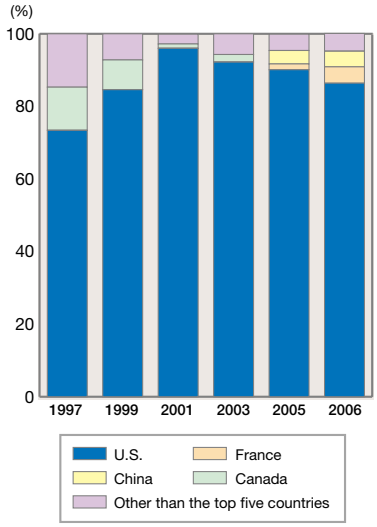
(Source) Compiled from companies' annual reports

Graph 1-33 Number of Graduates Majoring in ICT-Related Subjects by Country

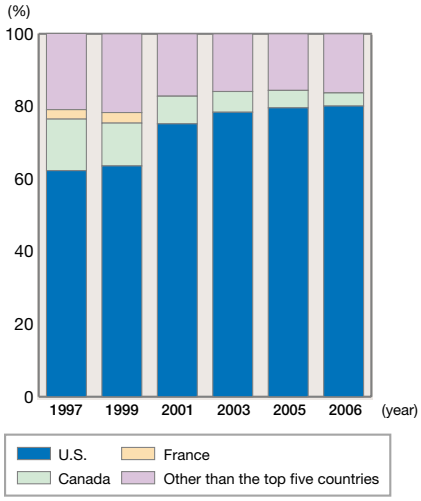


(Source)
Japan: Basic Survey on School (Ministry of Education, Culture, Sports, Science and Technology)
U.S.; Digest of Education Statistics (U.S. Department of Education)
China: China Software Development Research Report, 2003, 2004, 2005
India: Strategic Review 2002, 2003, 2004, 2007 (NASSCOM)

Graph 1-34 Changes in the Country-by-Country Share of the World Market for Routers (in shipment value)



Graph 1-35 Changes in the Country-by-Country Share of the World Market for Switches (in shipment value)



* Graphs 1-34 and 1-35 show country-by-country total of the shares of top five vendors.

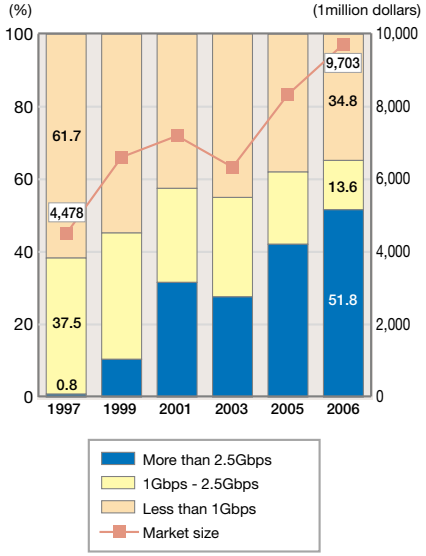
of broadband network is expected to expand the demand for high-end products for high-speed and large-capacity broadband. Therefore, Japan, which has realized the world's most advanced country in terms of broadband infrastructure, is expected to become a testbed for state-of-the-art products. It is likely to provide a significant opportunity for Japanese vendors to lead the diffusion and development of leading-edge network equipments in the world market **(Graph 1-36, Graph 1-37)**.

B. Mobile handset

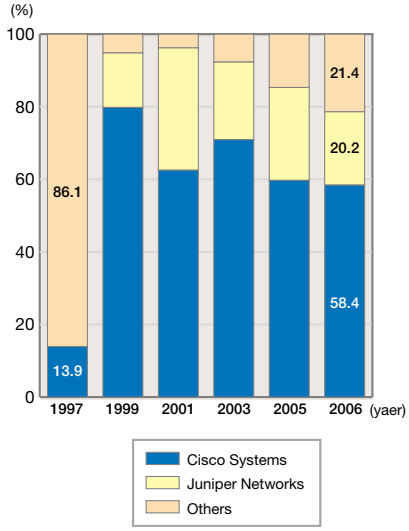
In the global market of mobile handset, key terminals in a ubiquitous network society, shows that Finland, to which Nokia belongs, tops the list. South Korea has increased its share in recent years. On the other hand, Japanese vendors' share has been decreasing **(Graph 1-38)**. With the center of the mobile handset market growth shifting from advanced countries to developing countries, the world mobile handset market has been expanding faster than the Japanese market **(Graph 1-39)**.

As to market size by communication system, the mobile handsets that utilize GSM, a communication system originally developed in Europe, accounted for more

Graph 1-36 Changes in the Capacity-by-Capacity Composition Ratio and Market Size of Routers in the World

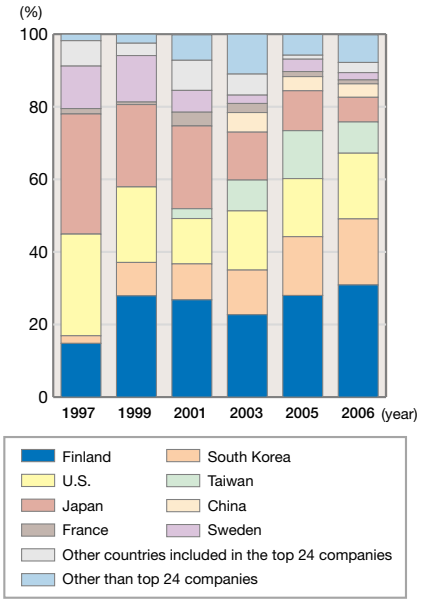


Graph 1-37 Changes in the Share of Routers of More Than 2.5 Gbps in the World Market



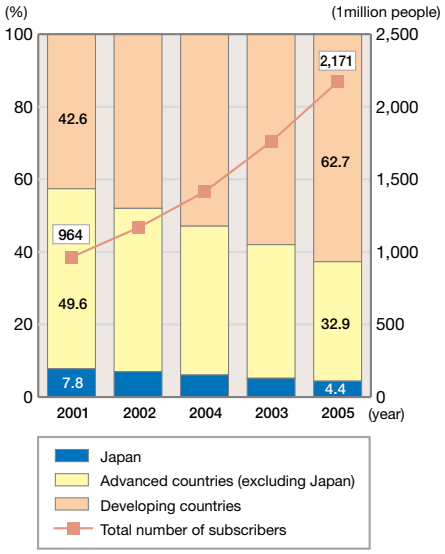
(Source for Graphs 1-34~37) Compiled from Dell' Oro Group materials

Graph 1-38 Changes in the Country-by-Country Share of the World Mobile-Phone Market (production base)



(Source) Compiled from Fuji Chimera Research Institute materials

Graph 1-39 Changes in the Number of Subscribers to Mobile Phones and their Ratio in the World



(Source) UNCTAD, "INFORMATION ECONOMY REPORT 2006"

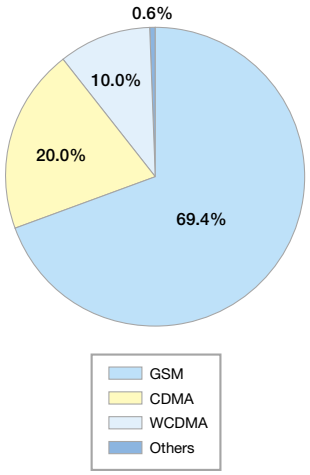
than two-thirds of the world market in 2006 **(Graph 1-40)**. Japanese vendors, who fell far behind others in the world market share of second-generation mobile phones, are competitive in the global market of the W-CDMA kept for third-generation mobile phones and have a certain market share **(Graph 1-41)**. It is important for them to promote global business development strategically by taking advantage of their strong competitiveness.

C. Flat-screen TVs/Flat Panel Display

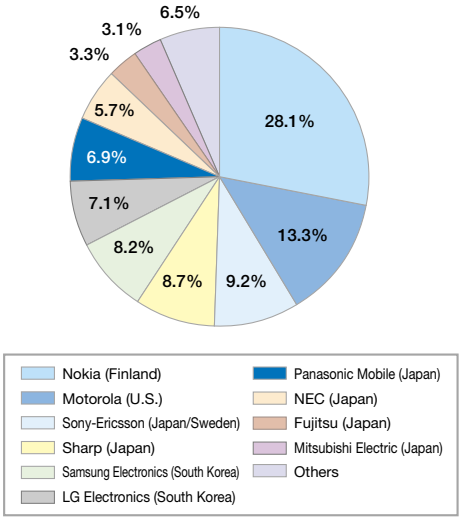
By the progress in technological innovation, such as liquid crystals and plasma, television as a key digital video equipment has been making a major shift from CRT-TV to flat-screen TV **(Graph 1-42)**. In particular, the market of LCD-TV has been expanding rapidly, with LCD-TV accounting for nearly half of the TV market on a shipment value basis. Meanwhile, South Korean and Taiwanese vendors have emerged as major players in the LCD-TV market and Japanese vendors' share has been declining **(Graph 1-43)**.

Since prices of flat panels have been declining rapidly, it is necessary to seek economies of scale by making

Graph 1-40 Percentage of Communication Methods Utilized in Mobile Phones in the World (production base, in 2006)

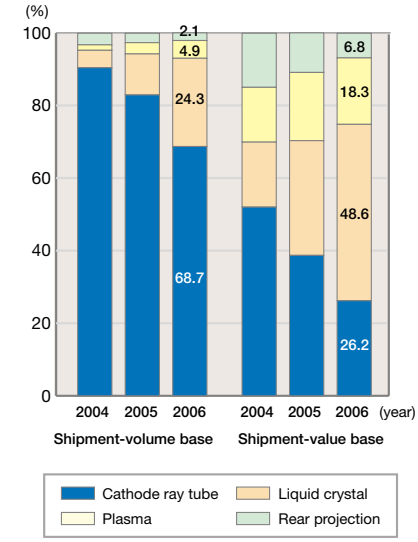


Graph 1-41 Share of W-CDMA Terminals in the World Market (production base; in 2006)

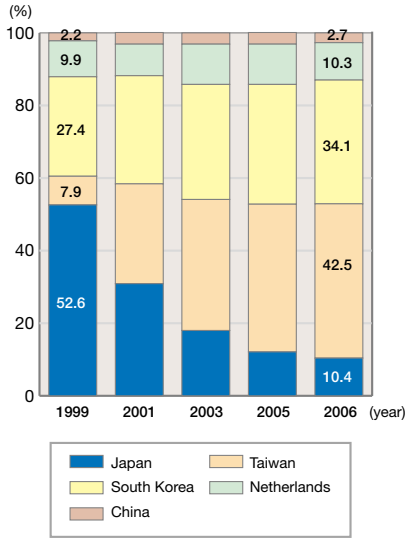


(Source for Graph 1-40 and 1-41) Compiled from Fuji Chimera Research Institute materials

Graph 1-42 Changes in the Type-by-Type Share of TVs in the World Market



Graph 1-43 Changes in the Country-by-Country Share (Shipment-Value Base) of Liquid Crystal Panels (10-inch or larger) in the World Market



(Source for Graph 1-42 and 1-43) Compiled from DisplaySearch materials

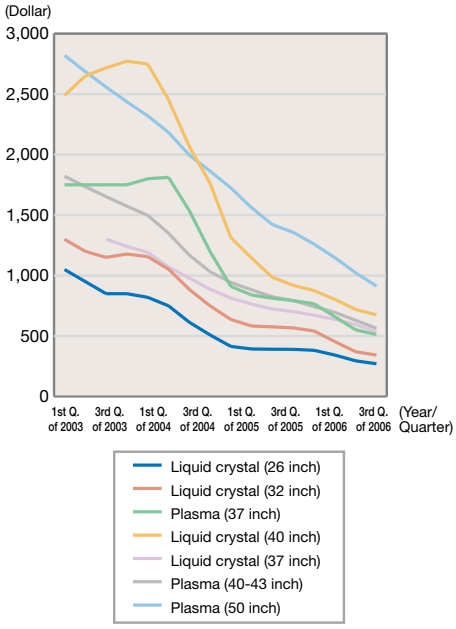
a large investment in a short cycle **(Graph 1-44)**. Furthermore, in order to cope with rapid technological innovations, promoting collaboration with material manufactures with international competitiveness may be one of the future options **(Graph 1-45)**.

D. Semiconductor

A semiconductor is an important component that defines the performance of various ICT equipment. While semiconductor shipment volume in the global market has been expanding drastically, Japan's share in the world has been declining consistently, and instead, South Korea has been increasing its share **(Graph 1-46)**.

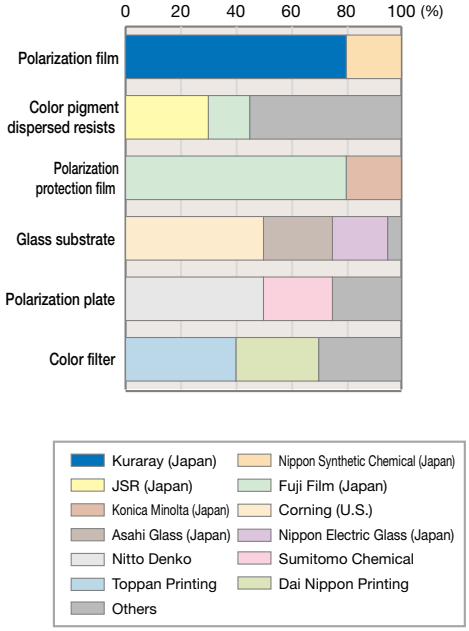
As to memory, Japan held a dominant share in the 1980s but it lagged behind some countries in terms of low-cost production such as a high yield rate and fine-processing technology, and large-scale investment capability. In the DRAM market, South Korea vendors hold a market share of more than 40% **(Graph 1-47)**. The market of system LSIs is expected to shift from those for specific products to those for unspecified products, such as digital consumer electronics. Therefore, one of the

Graph 1-44 Changes in the Price of Flat Panel for TV (price per sheet)



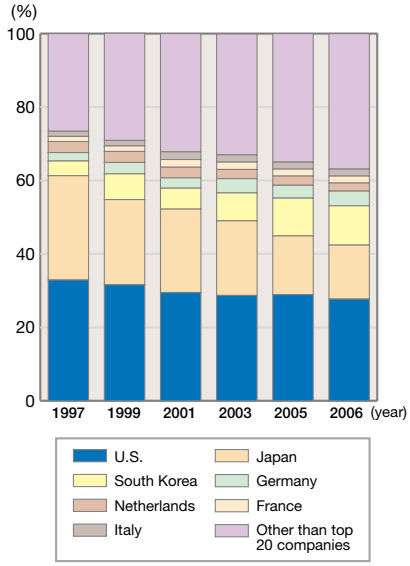
(Source) Compiled from DisplaySearch materials

Graph 1-45 World Market Share of Liquid Crystal Panel Components (in 2005)



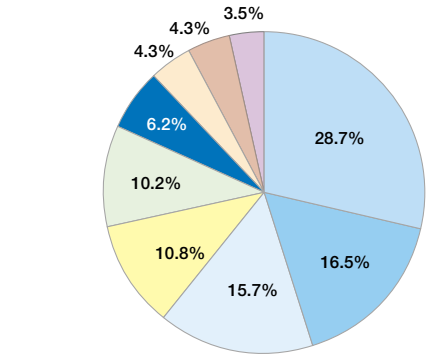
(Source) Nihon Keizai Shimbun, April 4, 2007 edition

Graph 1-46 Country-by-Country Share of the World Semiconductor Market (sales base)



* Total of country-by-country share of top 20 vendors

Graph 1-47 Share of World DRAM Market (sales base; in 2006)



(Source for Graph 1-46 and 1-47) Compiled form Gartner Dataquest

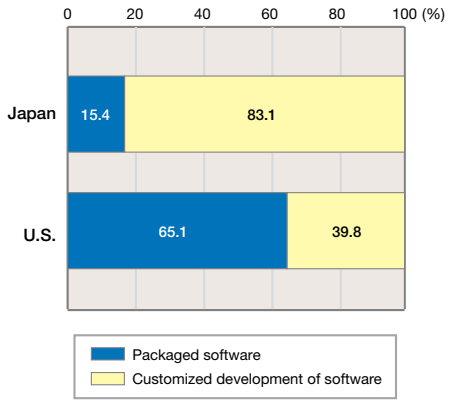
challenges of major Japanese semiconductor vendors with home appliances with a certain advantage in that they can produce system LSIs for their own use is how to standardize them for unspecified products.

E. Software

In the Japanese software industry, the percentage of packaged software is low and as a result Japanese vendors' world market share of software products is low, although they have a slightly high share in the system development/integration market **(Graph 1-48 and 1-49)**. Since Japanese vendors are mainly engaged in custom software, they cannot expect the merit of mass production, unlike in the case of packaged software, and their labor productivity is low.

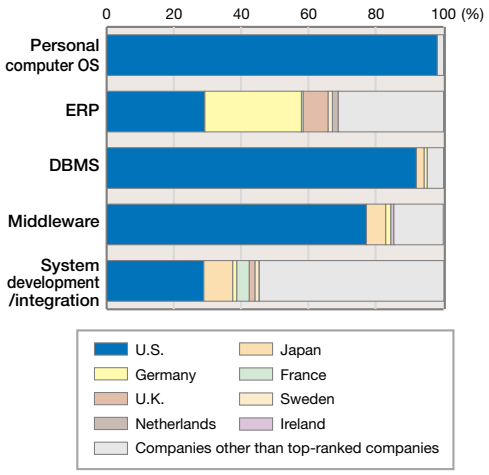
The progress in ubiquitous networks has produced new movements: diffusion of open source software (OSS) and software as a service (SaaS) **(Graph 1-50)**. They are likely to have a major impact on the business model of the conventional software industry in that OSS leads to a sharp price decline and SaaS targets small and mid-sized corporate customers who have been way behind in introducing software.

Graph 1-48 Difference in Category-by-Category Composition Ratio between Japanese and U.S. Software Industries



(Source) Japan: "FY2005 Survey on Specific Service Industries," Ministry of Economy, Trade and Industry
U.S.: "Service Annual Survey," Census Bureau, U.S. Department of Commerce

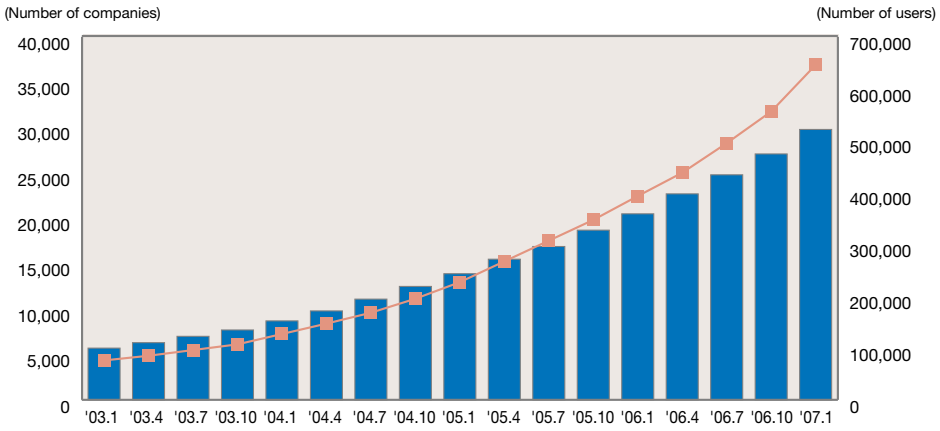
Graph 1-49 Country-by-Country Share of World Market of Various Software (2005)



* Total of country-by-country share of the companies making top 2 in personal computer OS, Top 13 in DBMS, and top 20 in other software

(Source) Compiled from Gartner Dataquest

Graph 1-50 Number of Companies and People Using Salesforce



* Salesforce is a vendor that provides customer management system through SaaS.

(Source) Salesforce.com

F. Contents

The size of the Japanese content distribution market was 11.3 trillion yen in 2005, with broadcasting contents accounting for about 70% of the image contents. Japanese broadcasters have developed their global business and Japanese broadcasting contents have been broadcast overseas **(Graph 1-51 and 1-52)**.

In some countries, the governments have been implementing measures to promote the overseas deployment of broadcasting contents. It is necessary for Japan to further strengthen its competitiveness by developing new markets and broadcasting channels overseas.

(5) Status of Japanese ICT Ventures

The number of listed Japanese ICT ventures has increased steadily **(Graph 1-53)**. A comparison of venture capital investment, which is essential for the growth of ventures, in Japan and the United States shows that the annual venture capital investment in Japan is extremely small compared with U.S. venture capital investment, and that the ratio of Japanese venture capital annual investment to GDP is one-fifth to one-sixth that of the United States **(Graph 1-54)**.

*Of the companies classified into the ICT industry and those whose core businesses do not exist without the Internet, the ICT venturs here refer to 185 firms established in or after 1994 and listed on the TSE first section, TSE second section, Mothers, Hercules, or JASDAQ in or after 1999.

The main customers of Japanese ICT ventures are ICT companies, suggesting that their growth depends largely on the existing ICT companies **(Graph 1-55)**. In recent years, the number of Japanese ICT ventures operating abroad has increased and the number of companies affiliated with Japanese ICT ventures has increased mainly in Asia **(Graph 1-56)**.

Graph 1-51 Examples of NHK's Overseas Deployment

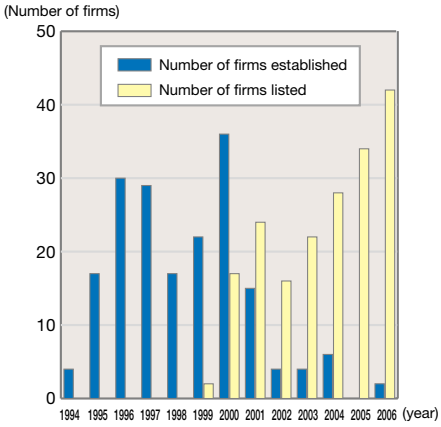
≪Exchanges of programs and news≫
Providing news (9 countries, 9 broadcasting organizations, 146 cases, total of 24 hours and 20 minutes)
"NHK Special" (5 countries, 5 broadcasting organizations, 8 cases, total of 7 hours and 52 minutes)
≪Grants≫
Provision through Foreign Ministry1s grants for cultural programs (4 countries, 1,341 programs)
(Bhutan, Dominica, Swaziland, Niger)
Provision through the Japan Foundation (36 countries, 1,118 programs)
(Asia, Central and Latin America, Africa, East Europe, etc.)
≪Sale of broadcasting rights≫
Provision of a total of 728 titles, 6,053 programs per year to broadcasting organizations in 39 countries or areas.

Graph 1-52 Examples of Private Broadcasters' Overseas Deployment

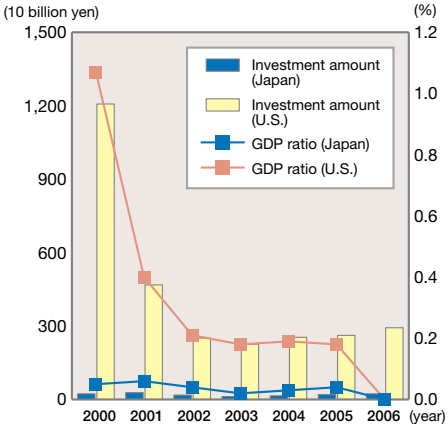
Broadcasters, led by key stations, are promoting exports of broadcasting contents. Estimated total revenue is slightly more than 5 billion yen.
In Taiwan, three channels specializing in Japan programs opened. Each channel purchases major programs in main genres from Japanese key station.
In Spain, local channels in 8 regions are broadcasting Japanese animation programs after dubbing them in their respective language (dialect) (some of them on a daily basis).
Exporting 58 programs (21 of them: animations). Overseas sales increased 4-fold in 4 years.
Sales of full-program slot packages to Asian countries, such as Taiwan, Hong Kong and Singapore.
Format sales to France. Broadcasted by France TFT. Market share at 34.7% (highest among the programs in the same time slot)

(Source for Graph 1-51 and 1-52) "Final report on discussions by the ICT International Competitiveness Council")

Graph 1-53 Changes in the Numbers of Japanese ICT Venture Firms Established and Listed



Graph 1-54 Ratio of Venture Capitals' Annual Investment to GDP in Japan and U.S.



(Source for Graph 1-53 and 1-54) "Survey Research on the Actual State and Growth of ICT Venture Firms"

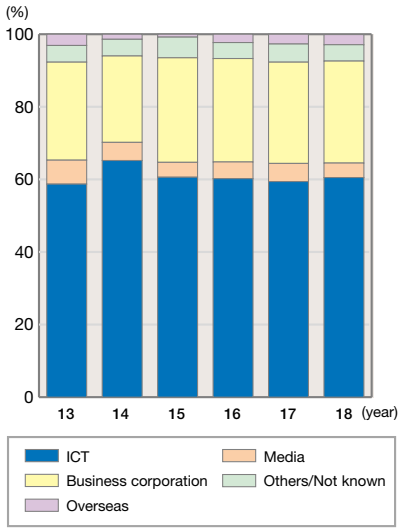
2. Corporate Competitiveness through Use ICT

(1) Effects of corporations' ICT use and business process/organization restructuring

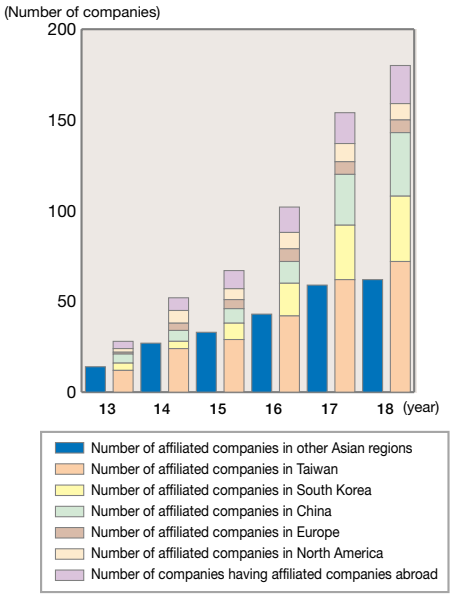
A study on ICT system introduction and accompanying business process/organization restructuring shows that the introduction of ICT systems will have its maximum effect if it is implemented along with business process/organization restructuring **(Graph 1-57)**.

A comparison of ICT system introduction and business process/organization restructuring by corporate size shows that the larger a corporation is, the higher the level of business process/organization restructuring is **(Graph 1-58)**. It also shows that small and mid-sized corporations are slow in introducing ICT systems.

Graph 1-55 Changes in the Main Customers of Japanese ICT Venture Firms

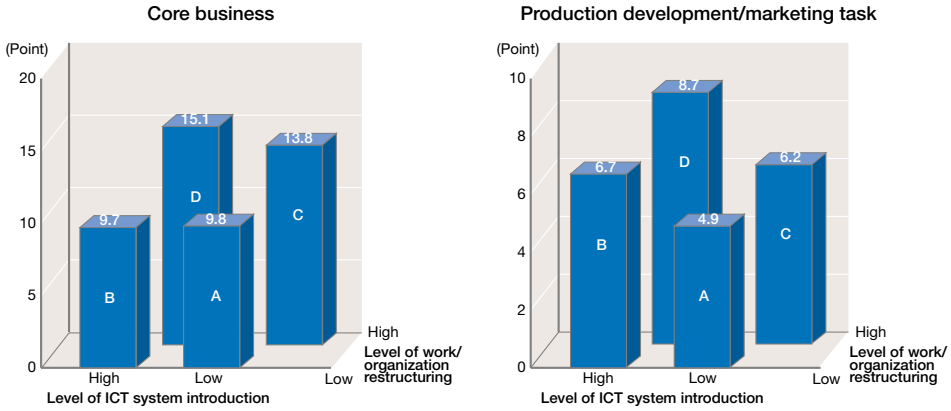


Graph 1-56 Changes in the Number of ICT Venture Firms Having Affiliated Companies Abroad and the Number of Japanese ICT Venture Firm-Affiliated Companies Abroad



(Source for Graph 1-55 and 1-56) "Survey Research on the Actual State and Growth of ICT Venture Firms"

Graph 1-57 Relationship between the Level of ICT System Introduction and Work/Organization Restructuring and the Level of Implementation Effects



A group:
Low level of restructuring x Low level of system introduction
B group:
Low level of restructuring x High level of system introduction
C group:
High level of restructuring x Low level of system introduction
D group:
High level of restructuring x High level of system introduction

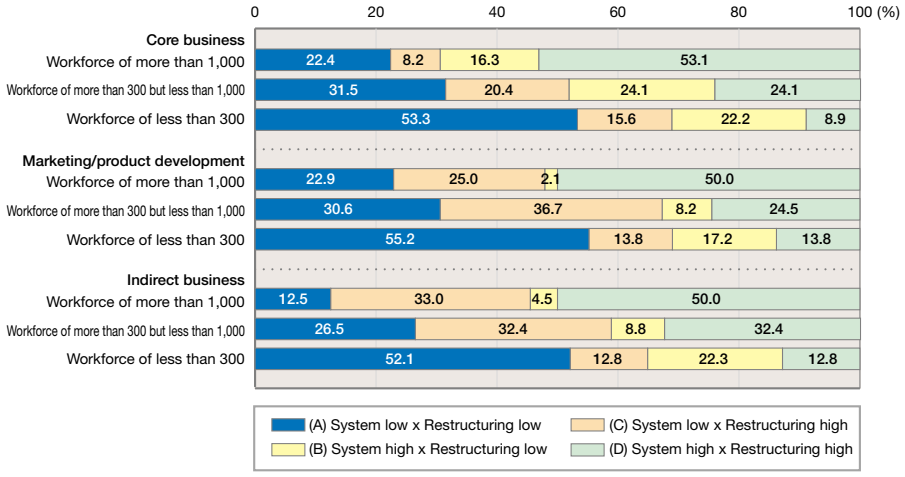
A group:
Low level of restructuring x Low level of system introduction
B group:
Low level of restructuring x High level of system introduction
C group:
High level of restructuring x Low level of system introduction
D group:
High level of restructuring x High level of system introduction

(Source) "Survey on ICT Industry's International Competitiveness and Innovation"

(2) Comparison of the effects of corporations' ICT use and business process/organization restructuring between Japan and the U.S.

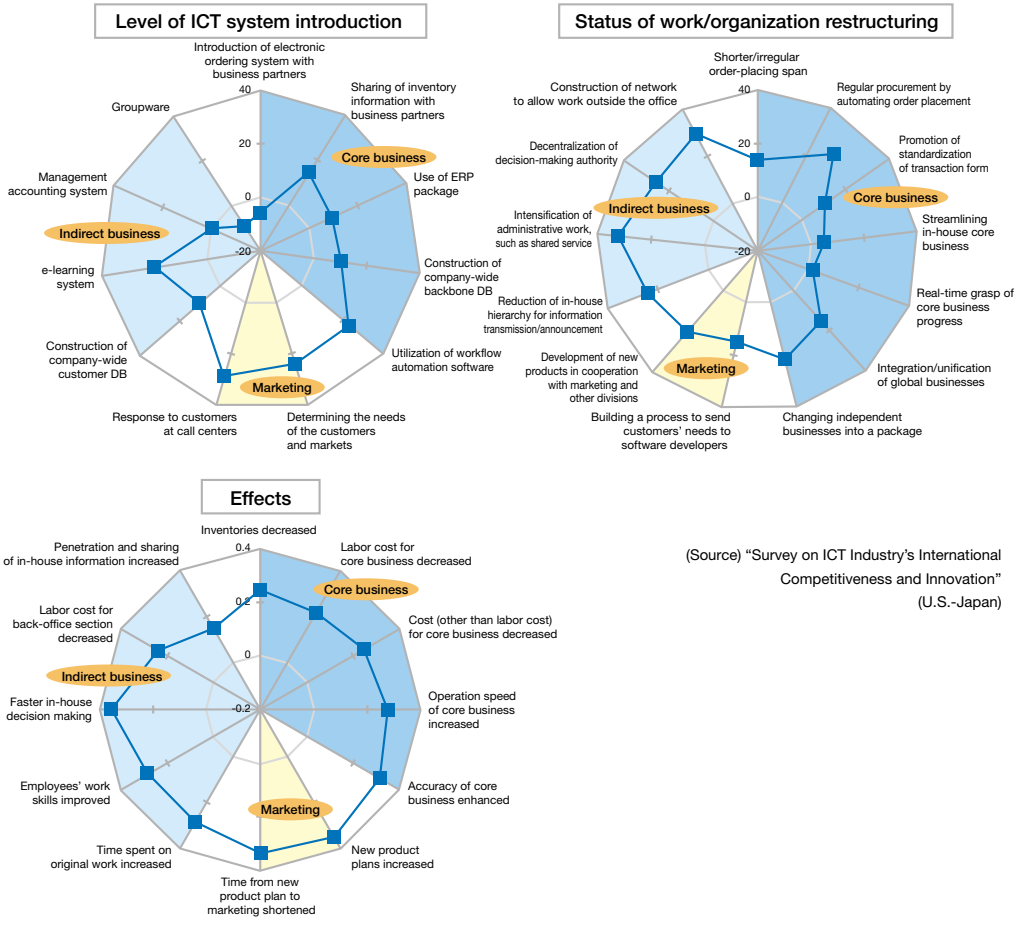
A comparison of the level and effects of corporations' ICT system introduction and business process/organization restructuring between Japan and the United States shows that Japanese corporations introduce ICT systems mainly in the areas related to business efficiency and that they are slower than their U.S. counterparts in utilizing ICT in the areas to enhance their added value relative to market and customers **(Graph 1-59)**. It also shows that, with regard to business process/organization restructur-

Graph 1-58 ICT System Introduction and Work/Organization Restructuring by Scope of Business and by Corporate Size



(Source) "Survey on ICT Industry's International Competitiveness and Innovation"

Graph 1-59 Comparison of the level and effects of ICT system introduction and work/organization restructuring between Japan and the U.S.



(Source) "Survey on ICT Industry's International Competitiveness and Innovation" (U.S.-Japan)

ing, Japanese corporations are particularly negative about reforms requiring reviews of their organization structure. Therefore, Japan has been less successful than the United States in effects that would lead to the enhancement of added value.

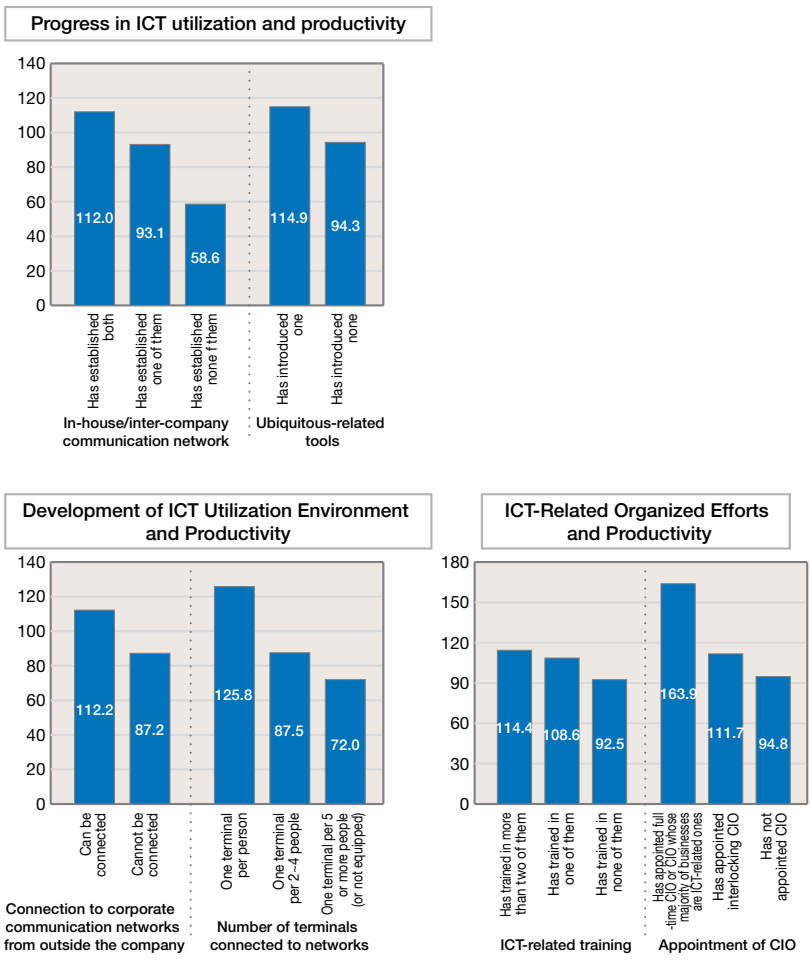
(3) Corporations' ICT use and increased productivity

A study of the relationship between ICT use and productivity, such as progress in ICT use, development of utilization environment, and organizational efforts for ICT use, shows that the productivity of the corporations making progress in ICT use is higher than that of the corporations making little progress in ICT use **(Graph 1-60)**. It also shows that the items that make particularly big differences in productivity are construction of intra/inter-company telecommunication networks, deployment of terminals connected to networks, and appointment of CIO.

(4) Necessity of establishing spatial codes to improve corporate productivity

If corporate activities conducted in the real world were realized in the online space, various corporate duties would be drastically streamlined and automated and corporate productivity would increase drastically by making full use of ICT network functions. To that end, it is essential to establish code systems connecting the real

Graph 1-60 Progress in ICT Utilization, Development of Utilization Environment, Relevant Organized Efforts and their Relationship with Productivity



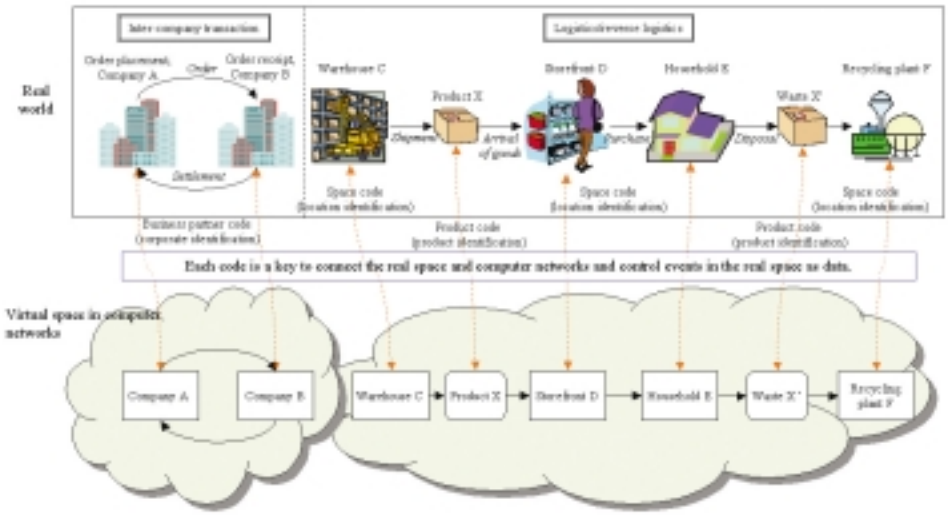
(Source) "2006 Survey on the Use of Communications (Business)," Ministry of Internal Affairs and Communications

world and ICT network space **(Graph 1-61)**. In Japan, in the realm of inter-company transactions, mainly industry-by-industry common infrastructure systems have been developed. But, their use has been mainly limited to big corporations. Therefore, it is necessary to promote the use of infrastructure systems among small and mid-sized corporations.

There are company code, product code and space code. As for company and product codes, code promotion groups have been established in Japan under private global standardization organizations. However, there is no such group for space code.

Since systematic development of codes is expected to increase the efficiency and convenience of various entities' transactions by leaps and bounds, it is important to develop each code as a social infrastructure open to every industry and corporation.

Graph 1-61 Case Where Code is Necessary for Corporate Activities in Network Space



Compiled from Ministry of Internal Affairs and Communications materials