MIC
Ministry of Internal Affairs and Communications

2007 White Paper
Information and Communications in Japan

Progress of Ubiquitous Economy and Global Business Development

<Outline>

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Ministry of Internal Affairs and Communications,

JAPAN

Feature: “Progress of Ubiquitous Economy and Global Business Development”

Section 1. ICT and Economic Growth

-Macroeconomic quantitative analysis of ICT’s economic growth potential in “the Era of Information and Knowledge” by production function model
-Analysis of ICT industry trends and economic ripple effect

Growth of Japanese Economy

ICT Industry Competitiveness, Globalization

ICT industry ⟷ Industries using ICT

Corporate Competitiveness, Productivity Growth

Section 2. ICT and Competitiveness

-Analysis of Japanese ICT industry’s position in the global market and factors of the position on the basis of a variety of data on competitiveness as one of the factors fulfilling Japanese economic growth
-Microeconomic quantitative analysis of interrelation between ICT use and corporate competitiveness / productivity growth

Changes in Life and Society

Section 3. ICT and Life and Society

-Analysis of changes in society and economy accompanied with ubiquitous network development such as lifestyle changes and digital divide

* “Ubiquitous Economy”: social and economic characteristics brought by ubiquitous network development

1 ICT and Economic Growth
(1)The Advent of the Era of Information and Knowledge and Economic Growth -1

➢"The era of information and Knowledge" will advent after the"Agricultural Era" and "Industrial Era" when we see economic growth from a very long-term point of view, in which information and knowledge of the ubiquitous network are new sources of the growth (Fig. 1-1).

➢When we represent the trend in ubiquitous network development as the "Ubiquitous Index", the result shows that the index started to increase in 1995, then increased rapidly after 2000 (Fig. 1-2).

Fig.1-1 Track of economic growth and the advent of the new era

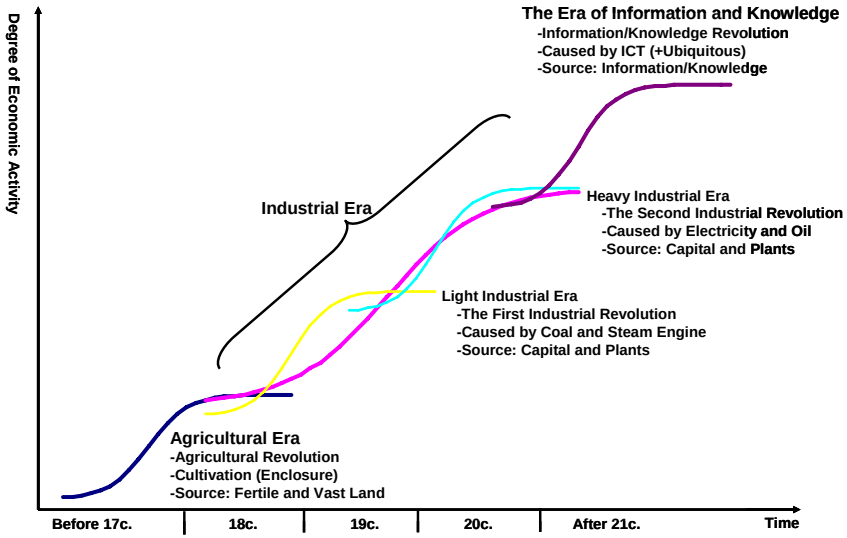
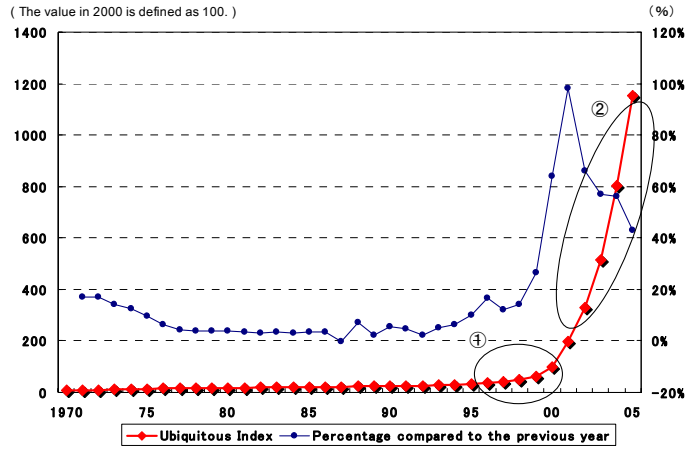


Fig.1-2 Trends in Ubiquitous Index



Ubiquitous Network → Expansion of user range (Expansion of prevalence)
+ Increase and diversification of use (Deepening of use)

Ubiquitous Index is calculated from the following data
Expansion of prevalence: Number of fixed phone subscribers, Number of mobile phone subscribers, Percentage of households with PC, Internet penetration rate, Number of broadband subscription
Deepening of use: Amount of information, Percentage of companies which allow tele-working, Percentage of multi-use software

1 ICT and Economic Growth
(1)The Advent of the Era of Information and Knowledge and Economic Growth -2

➢When we calculate the contribution of ubiquitous network development to economic growth by the Ubiquitous Index and the macroeconomic production function, the result shows a positive contribution (Fig. 1-3). In the Era of Information and Knowledge, economic growth will be promoted by the progress of ubiquitous network use.

➢It is estimated that the GDP growth rate will increase by about one point from 2007 to 2010 when the movement of the Japanese economy will be strong and the potential of the ubiquitous network will be fully realized compared to the opposite case (Fig. 1-4).

Fig.1-3 Calculation of ubiquitous effect by macroeconomic production function

Function : $\ln(Y/L) = \ln A + \alpha' \cdot \ln(Kall/L) + \beta \cdot \ln(Ki \cdot U) + dummy$

Result : $\ln(Y/L) = -0.8511 + 0.4296 \cdot \ln(Kall/L) + 0.0105 \cdot \ln(Ki \cdot U) + 0.0409$

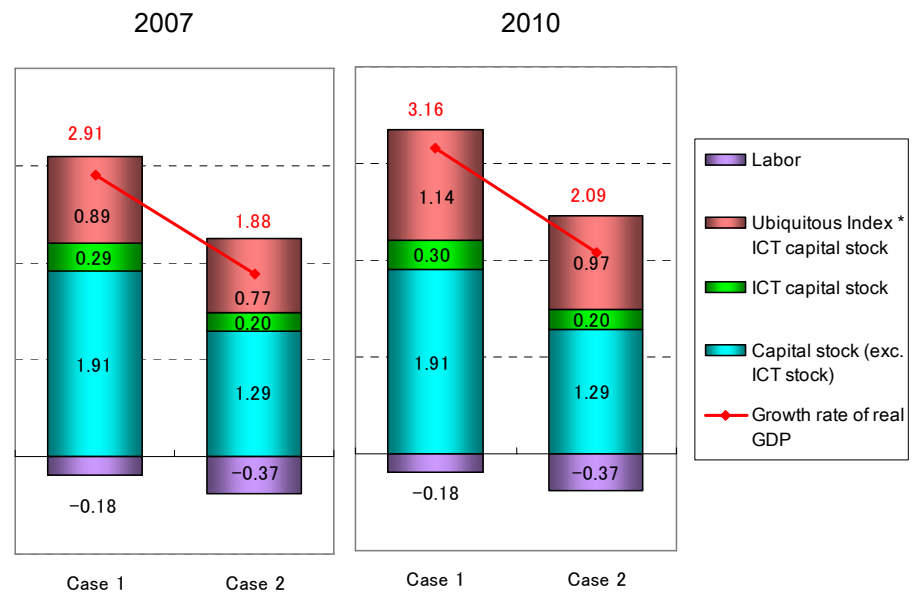
(-18.4300) (19.4500) (2.8300) (3.5600)

R-squared = 0.9956 Durbin-Watson statistic = 1.6874

※Values in brackets represent t-statistic.

The result shows the positive contribution of development of ubiquitous network use (U=Ubiquitous Index) to economic growth.

Fig.1-4 Estimation of contribution of ubiquitous effect to real GDP growth



※Case 1 is when the movement of the Japanese economy will be strong and the potential of the ubiquitous network will be fully realized.
Case 2 is when the movement of the Japanese economy will not be strong and the potential of the ubiquitous network will not be fully realized.

1 ICT and Economic Growth
(2)Trends in the ICT Industry -1

➢ICT industry accounts for about 10% of nominal domestic output and is the largest of all industries (Fig.1-5).
➢Contribution ratio of the ICT industry to real GDP growth was 42.4% in 2005. Thus, the ICT industry dramatically impacts economic growth (Fig. 1-6).

Fig. 1-5 Nominal domestic output of major industries (2005)

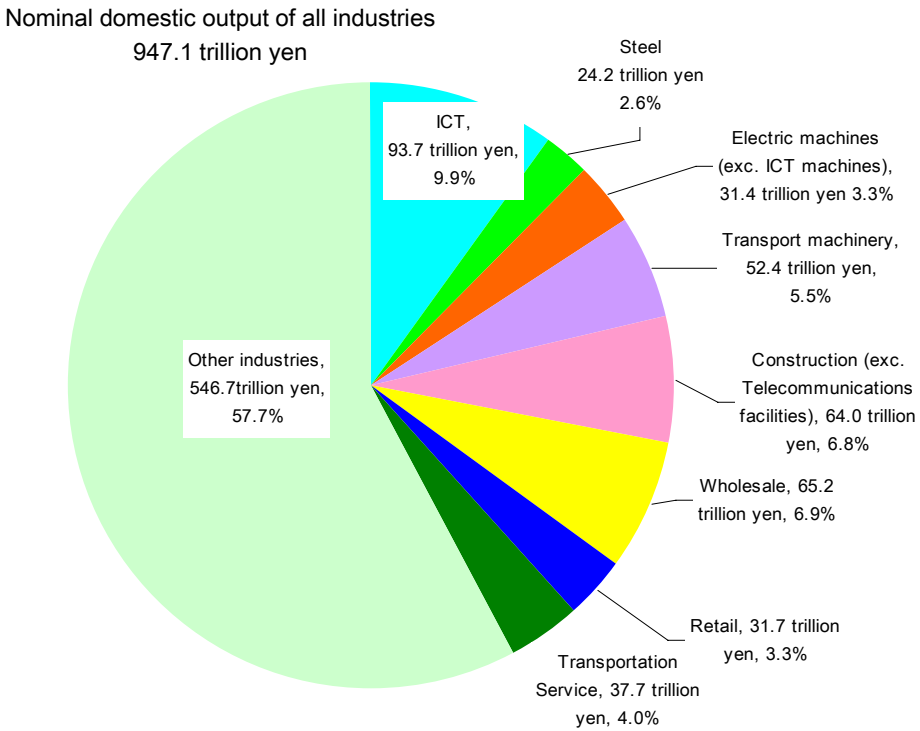
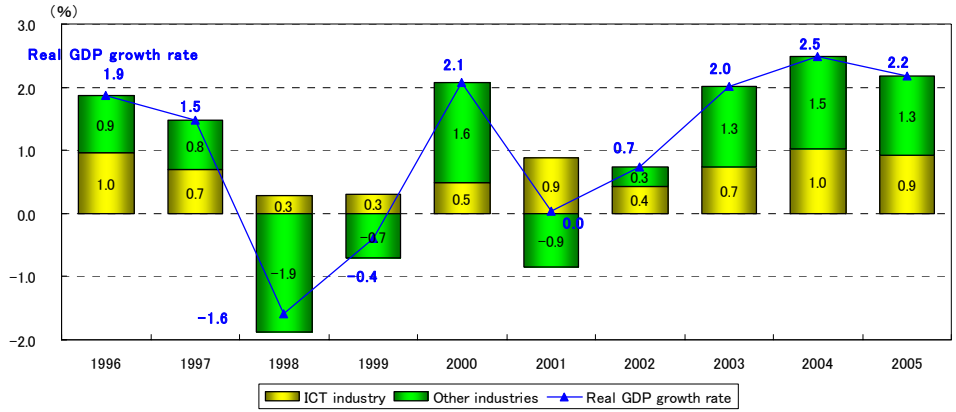


Fig. 1-6 Contribution of ICT industry to real GDP growth rate



1 ICT and Economic Growth
(2)Trends in ICT Industry -2

➢Real GDP of the ICT industry has increased steadily since 1995 (Fig. 1-7).

➢Number of employees of the ICT industry has decreased since 2001. Especially, ICT-related manufacturing shows a rapid decrease (Fig. 1-8).

Fig. 1-7 Trends in real GDP of ICT industry

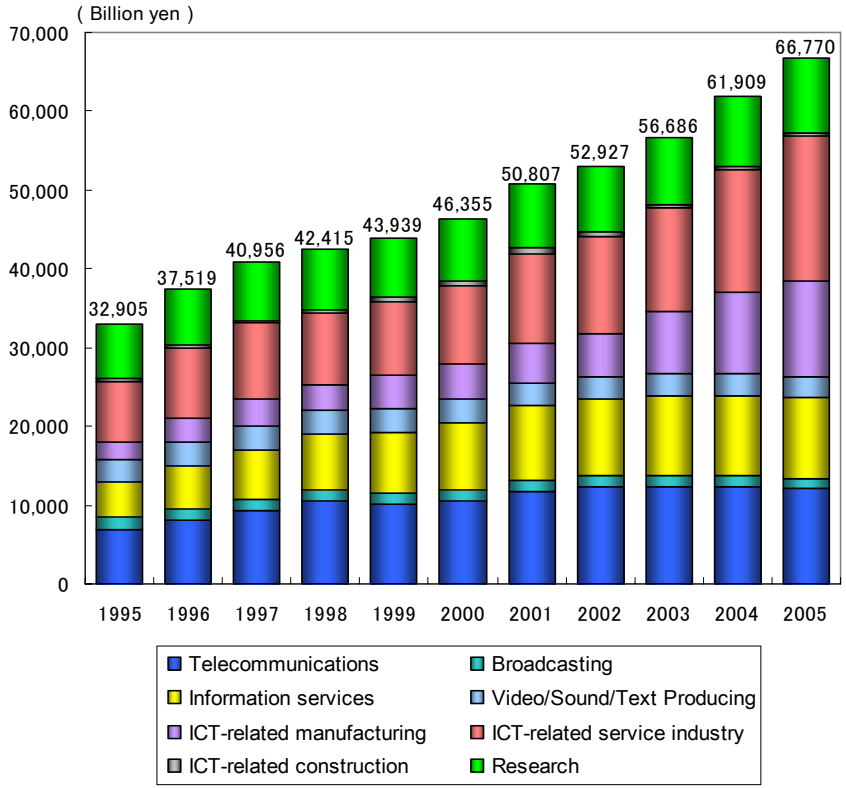
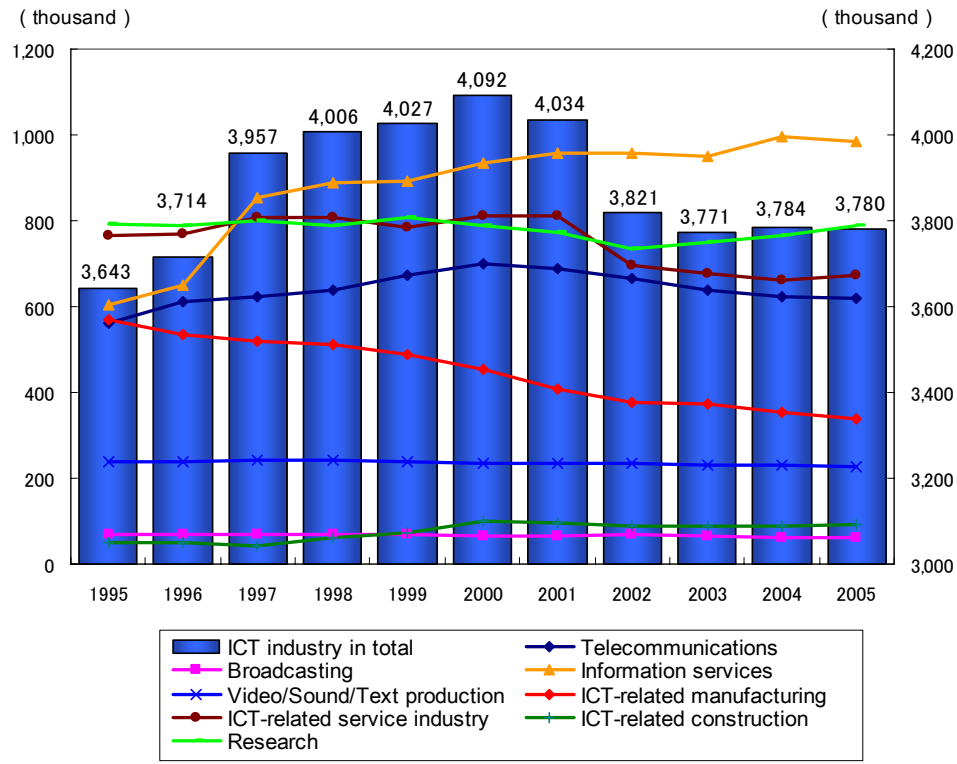


Fig. 1-8 Trends in number of employees of ICT industry



1 ICT and Economic Growth
(3)ICT Investment and Economic Growth

➢ICT investment and GDP of the US has been higher compared with those of Japan (Fig. 1-9).

➢Labor productivity of the US has consistently increased since 1990. In particular, the contribution of the TFP growth rate has been large. That of Japan has been unchanged since 1990. In the case of Japan, the contribution of capital stock has been large, while that of TFP growth has been small (Fig. 1-10).

➢Contribution of TFP growth to labor productivity in Japan is 2.21% in the manufacturing industries and 0.14% in the service industries. This is one of the main reasons for the low labor productivity of Japan's service industry (Fig. 1-11).

(ref.) Innovation effect of ICT use in businesses comes out as TFP growth.

Fig.1-9 Trends in ICT investment and GDP

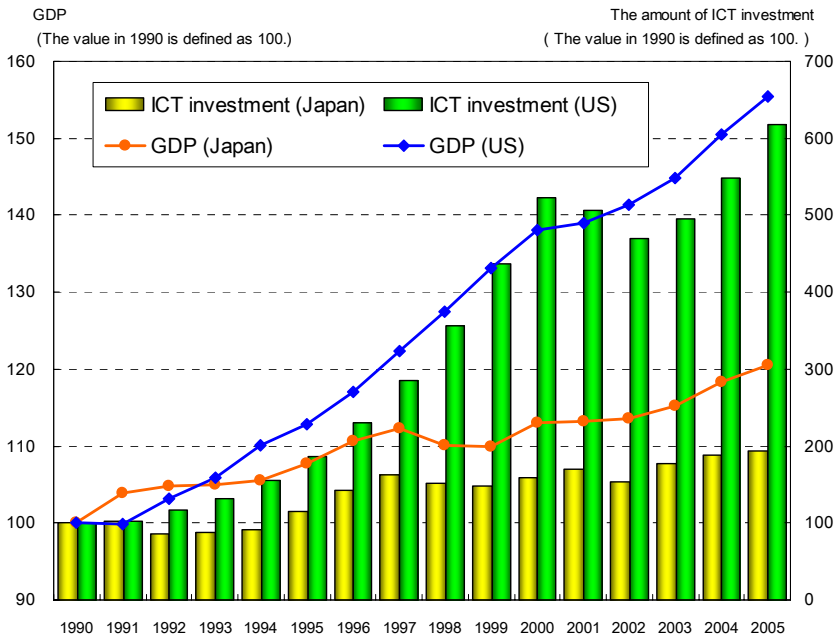


Fig.1-10 Labor productivity growth rate and its decomposition

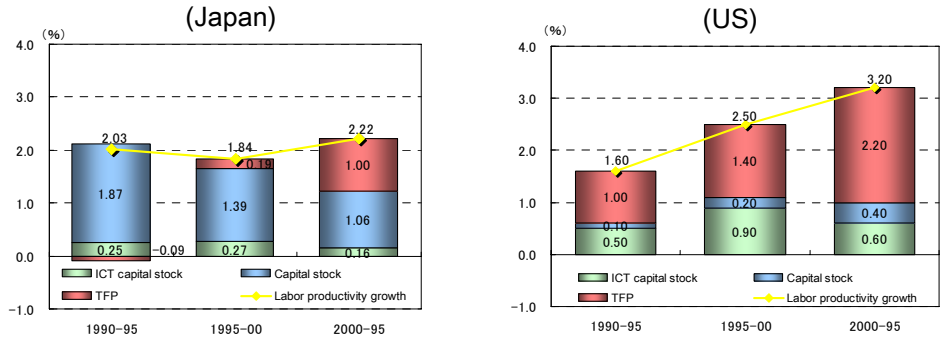
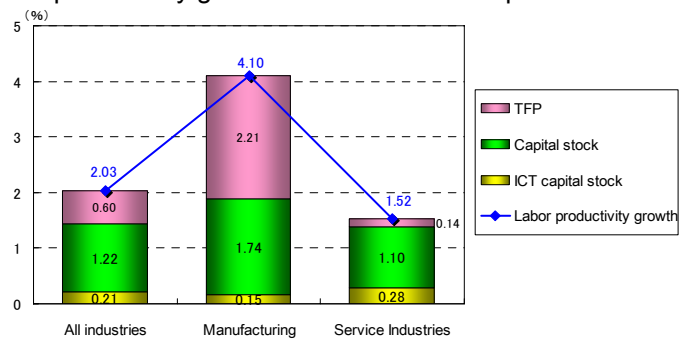


Fig.1-11 Japan's labor productivity growth rate and its decomposition



1 ICT and Economic Growth
(4)ICT Investment and TFP Growth

➢Contribution of TFP growth to domestic output growth these past 10 years in the wholesale and transportation service sector has decreased, while that in the ICT industry and electric machinery sector has rapidly increased (Fig. 1-12).
➢In the manufacturing industries, the higher the ICT investment growth rate, the higher is the TFP growth rate. In the service industries, the ICT investment growth rate does not necessarily lead to a high TFP growth rate, which implies that service industries do not utilize ICT efficiently (Fig. 1-13).

Fig.1-12 Contribution of TFP growth to domestic output growth

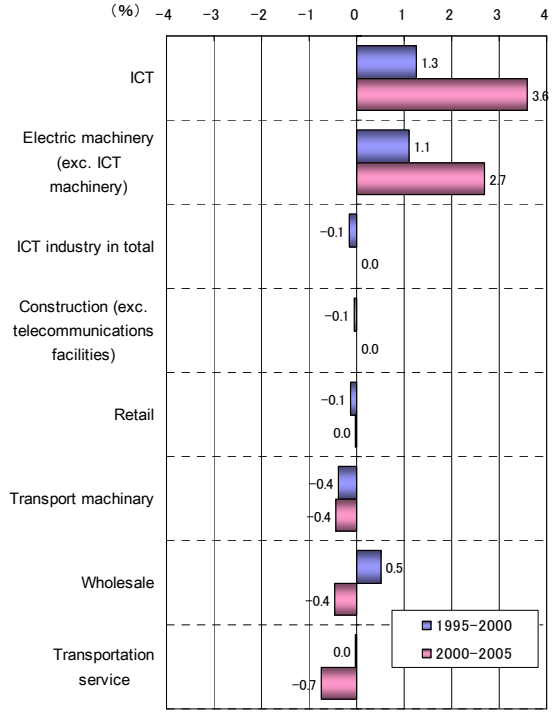
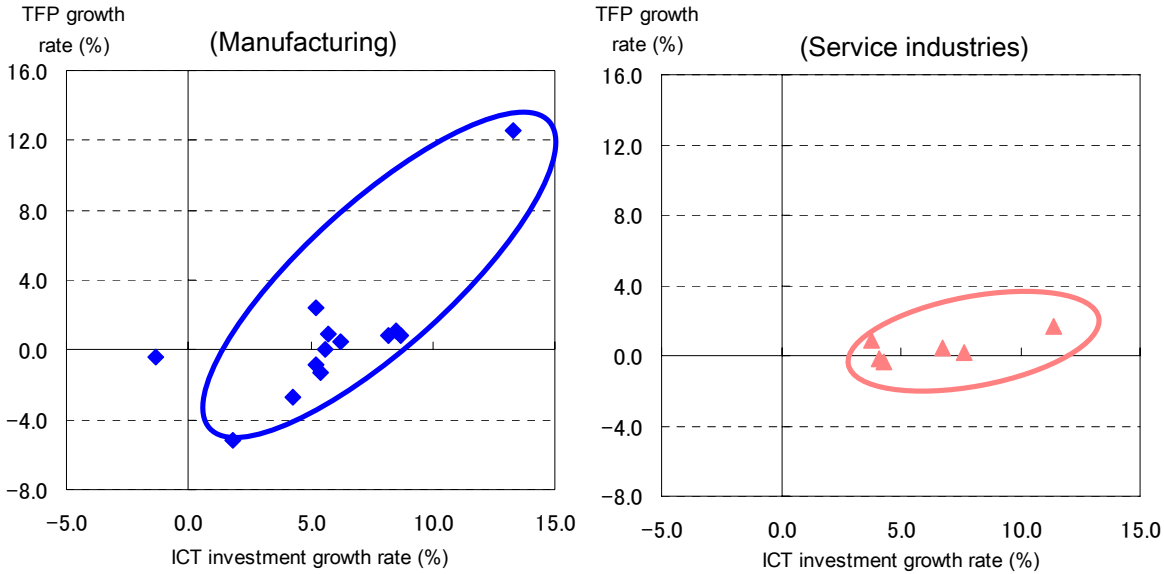


Fig.1-13 Interrelation between ICT investment growth and TFP growth



1 ICT and Economic Growth
(5)Economic Ripple Effect of ICT Industry

➢Economic ripple effects (value-added and employment induced by ICT industry) contributes positively to economic growth by animating economic activity in all industries (Fig. 1-14).

➢The amount of value-added induced by the ICT industry has increased (except in 2002), which implies that the weight of the ICT industry in the overall economy has increased (Fig. 1-15).

➢Decrease of employment induced by ICT-related manufacturing sector between 1995 and 2005 prevents the increase of employment induced by the overall ICT industry (Fig. 1-16).

Fig.1-14 Economic ripple effect of ICT industry

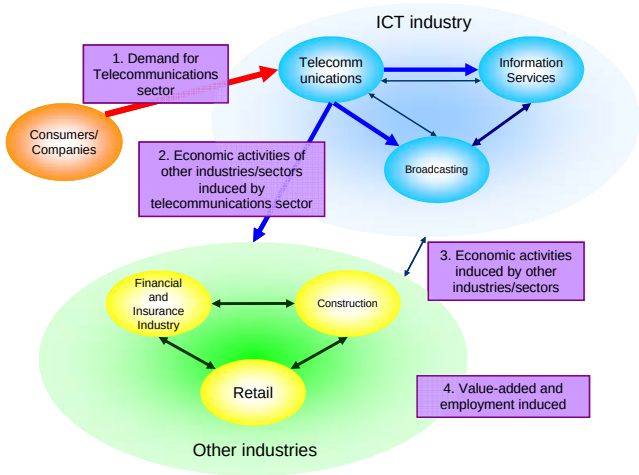


Fig.1-15 Value-added which major industries induce

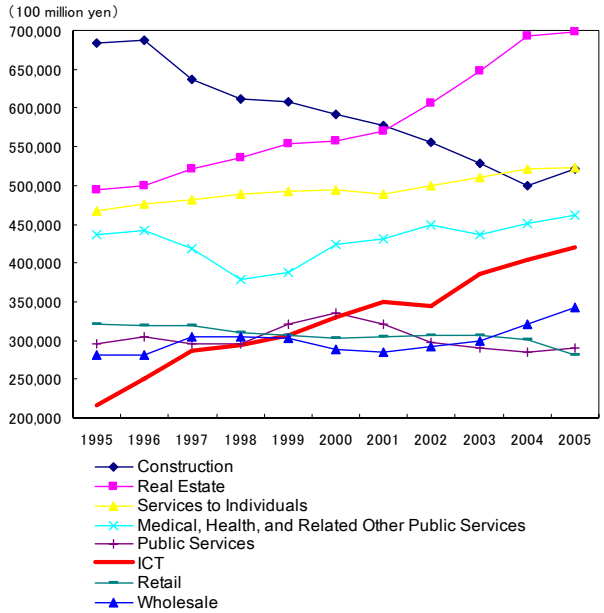
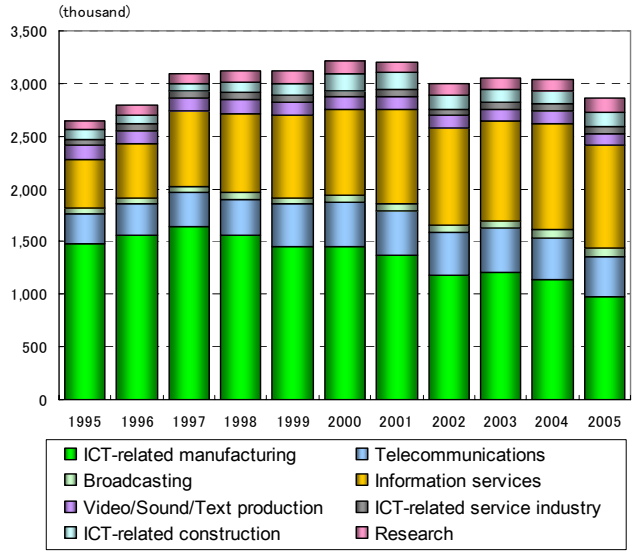


Fig.1-16 Employment which each sector of ICT industry induces



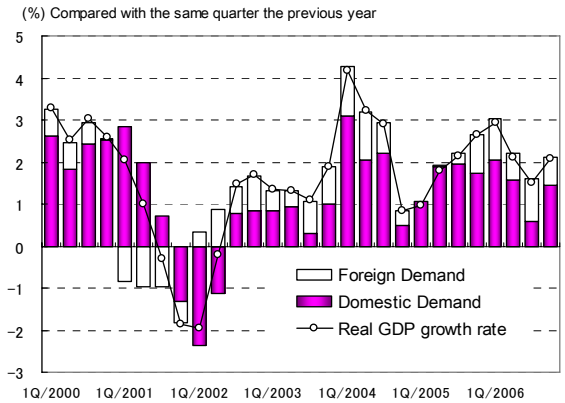
1 ICT and Economic Growth
(6)ICT-related Demand and Trends of Japanese Economy (Domestic Demand)

➢Real GDP growth of Japan has been positive since 2002. Contribution of domestic demand to economic growth has increased from 2004 to 2005 (Fig. 1-17).

➢ICT-related consumption has positively contributed to total consumption. In particular, that of mobile phone fees, internet connection fees, and ICT-related equipment has been large (Fig. 1-18).

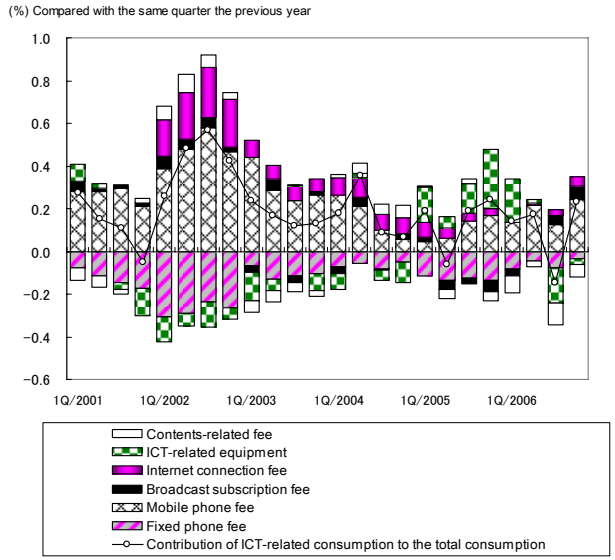
➢ICT-related machinery investment has positively contributed to total corporate investment since 2003. In particular, that of semiconductor equipment has been large (Fig. 1-19).

Fig.1-17 Contribution of domestic demand and foreign demand to real GDP



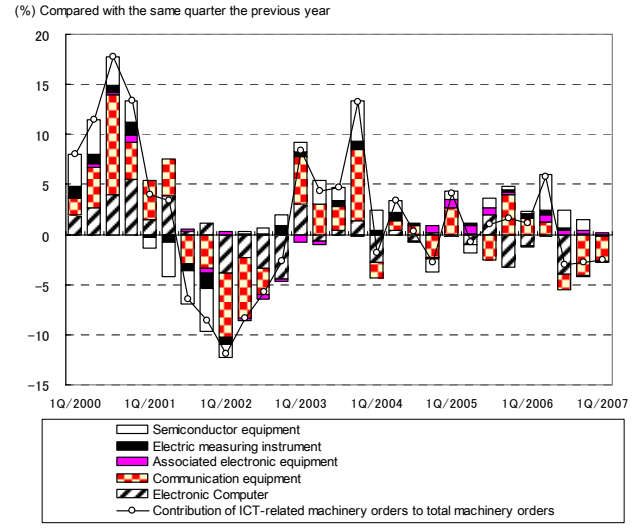
Source: Cabinet Office

Fig. 1-18 Contribution of ICT-related consumption to total consumption



Source: Ministry of Internal Affairs and Communications (MIC)

Fig.1-19 Contribution of ICT-related machinery orders to total machinery orders



Source: Cabinet Office

1 ICT and Economic Growth
(6)ICT-related Demand and Trends in Japanese Economy (Foreign Demand)

- Exports to the US have recovered since 2003. Exports to China have consistently increased since 1999 (Fig. 1-20).
- ICT-related exports to the US have fallen since 2000. Exports to China have rapidly increased since 1999 (Fig. 1-21).
- ICT-related exports to China, above all, intermediate products such as semiconductor equipment and audio/visual equipment, have remarkably increased (Fig. 1-22).
- In line with the rapid growth of the Asian market such as the Chinese market and trends in establishing the international division of labor, the center of Japan's ICT-related exports is shifting from final products for the US to intermediate products for Asia such as China.

Fig.1-20 Total amount of exports from Japan

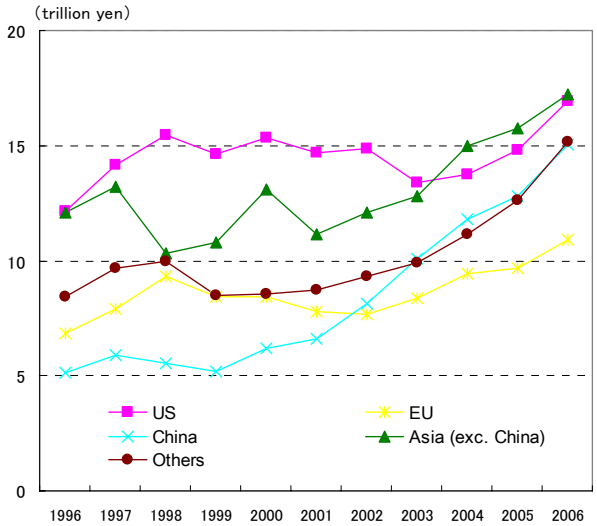


Fig.1-21 Total amount of ICT-related exports from Japan

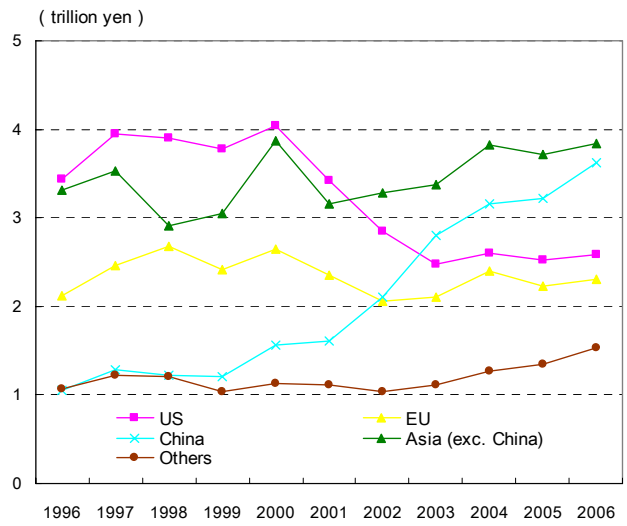


Fig.1-22 Total amount of ICT related exports to China from Japan

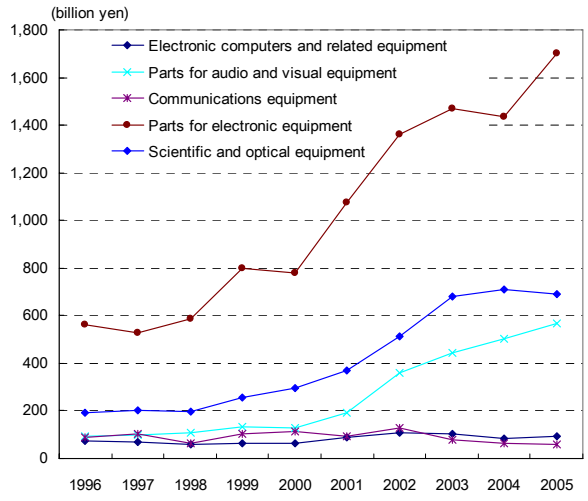


Fig 1-20 ~ 1-22 Source: Ministry of Finance

*1 Asia includes Korea, Taiwan, Singapore, Malaysia, Indonesia, Philippine, and India.
*2 ICT-related exports include Electronic computers and related equipment, Audio and visual equipment, Communications equipment, Electronic measuring instrument, Scientific and optical equipment, Memory media, Parts for audio and visual equipment, and Parts for electronic equipment (inc. semiconductors).

1 ICT and Economic Growth
(7) Smoothing Inventory Cycle

➢In recent years, the circular orbit of the inventory cycle has become smaller, which implies that the inventory cycle has been smoothed (Fig. 1-23, 1-24).

➢Reasons for this trend can be pointed out as an accurate grasp of consumer needs by solving the information mismatch between suppliers and consumers through CGM (Consumer Generated Media) such as blogs and SNS (Social Networking Service) and an efficient inventory management by ICT use such as SCM (Supply Chain Management).

Fig.1-23 ICT-related inventory cycle
(1999 4Q - 2002 4Q)

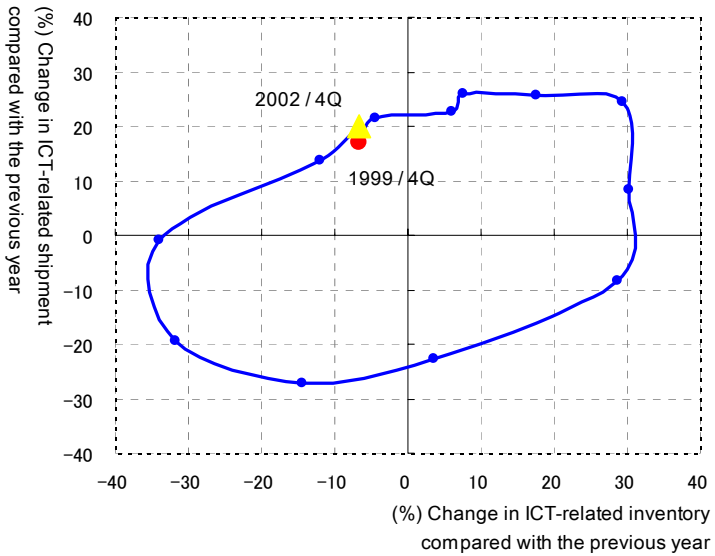


Fig.1-24 ICT-related inventory cycle
(2002 4Q - 2005 4Q)

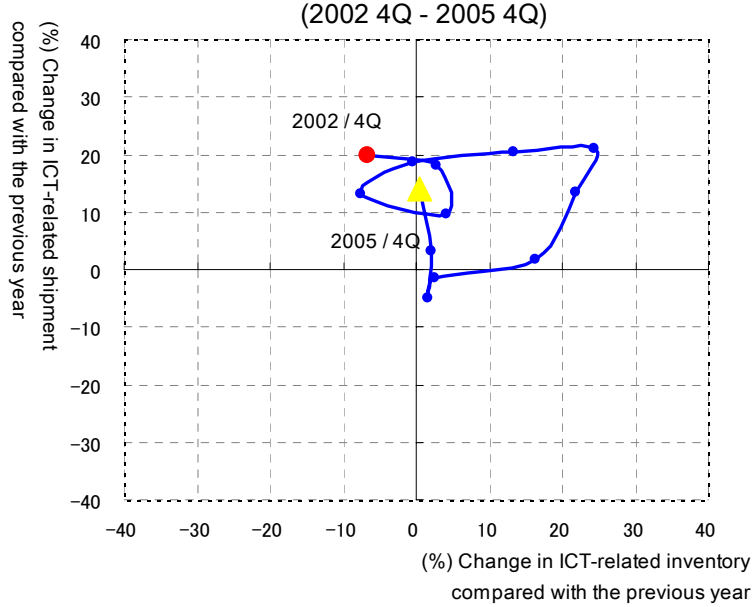


Fig.1-23, 1-24 Source: Ministry of Economy, Trade and Industry (METI)

1 ICT and Economic Growth
(8) Analysis of Regional Features in ICT Industry

➢Real domestic output of the Kanto region accounts for the largest proportion of the overall real domestic output in both the manufacturing sector and service sector of the ICT industry. In recent years, the service sector tends to be clustering in the Kanto region, while service sector tends to be clustering in other regions (Fig. 1-25, 1-26).

➢Production of ICT manufacturing sectors in other regions induced by the ICT service sector in the Kanto region, and production of the ICT service sector in the Kanto region induced by ICT manufacturing sectors in other regions have increased. The growth of Japan's ICT industry contributes to the development of regional economies as a whole through ripple effects among regions (Fig. 1-27, 1-28).

Fig.1-25 Percentage of real domestic output of ICT manufacturing sector in each region to that in total

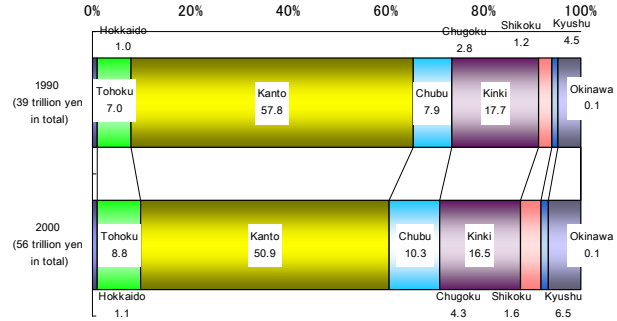


Fig.1-26 Percentage of real domestic output of ICT service sector in each region to that in total

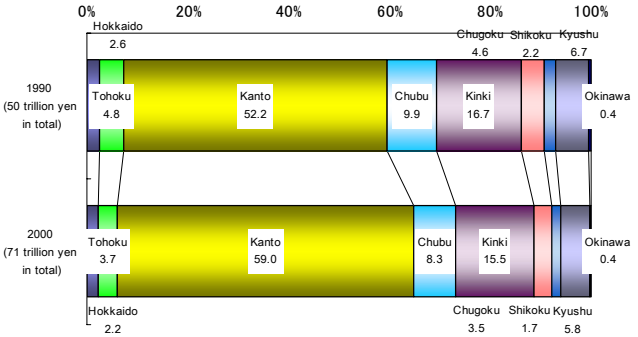


Fig.1-27 The amount of output induced by the Kanto region and its growth rate in other regions

		The amount of output induced (million yen) (By) Kanto		
		ICT manufacturing sector	ICT service sector	Other industries
		1990		
Other regions (exc. Kanto)	ICT manufacturing sector	1,962,991	51,639	1,743,060
	ICT service sector	459,657	54,022	1,759,747
	Other industries	4,823,735	625,351	41,388,986
		1995		
Other regions (exc. Kanto)	ICT manufacturing sector	2,144,682	75,228	1,799,711
	ICT service sector	397,671	80,861	1,712,105
	Other industries	4,252,263	863,355	38,766,606
		2000		
Other regions (exc. Kanto)	ICT manufacturing sector	2,904,146	152,256	2,459,095
	ICT service sector	505,618	149,753	1,928,209
	Other industries	4,112,399	1,215,412	37,096,507

	The growth rate of output induced (By) Kanto		
	ICT manufacturing sector	ICT service sector	Other industries
1990-1995			
	9.3%	45.7%	3.3%
	-13.5%	49.7%	-2.7%
	-11.8%	38.1%	-6.3%
1995-2000			
	35.4%	102.4%	36.6%
	27.1%	85.2%	12.6%
	-3.3%	40.8%	-4.3%

Fig.1-28 The amount of output induced by other regions and its growth rate in the Kanto region

		The amount of output induced (million yen) (By) Other regions (exc. Kanto)		
		ICT manufacturing sector	ICT service sector	Other industries
		1990		
Kanto	ICT manufacturing sector	1,009,095	156,595	3,359,910
	ICT service sector	421,043	245,126	5,206,722
	Other industries	2,132,300	611,377	36,798,376
		1995		
Kanto	ICT manufacturing sector	1,025,278	162,833	3,220,914
	ICT service sector	427,482	248,190	4,916,814
	Other industries	2,363,348	694,443	38,823,006
		2000		
Kanto	ICT manufacturing sector	1,787,955	200,753	3,708,329
	ICT service sector	843,127	502,571	7,761,164
	Other industries	3,016,255	841,449	40,436,733

	The growth rate of output induced (By) Other regions (exc. Kanto)		
	ICT manufacturing sector	ICT service sector	Other industries
1990-1995			
	1.6%	4.0%	-4.1%
	1.5%	1.3%	-5.6%
	10.8%	13.6%	5.5%
1995-2000			
	74.4%	23.3%	15.1%
	97.2%	102.5%	57.8%
	27.6%	21.2%	4.2%

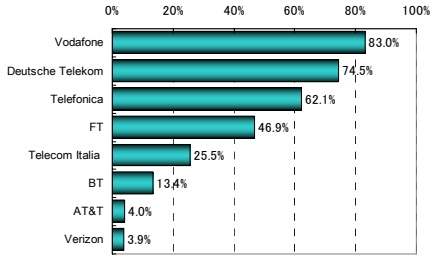
Fig.1-25 ~ 1-28 Source: Survey of impact on regional economy and regional industry by ICT (Institute for Information and Communications Policy (IICP), MIC)

2-1 International Competitiveness of ICT Industry
(1) Globalization of ICT Network (Trends in Telecommunications Carriers)

➢The world's major telecommunications carriers are developing their global business. In particular, the foreign turnover ratio of carriers in Europe tends to be high, which implies that they are developing their global business actively (Fig. 2-1, 2-2).

➢The world's major telecommunications carriers are working on projects towards NGN (Next Generation Network) establishment. Active global business development is important for carriers to make their own global technology standards for NGN establishment in the future (Fig. 2-3).

Fig.2-1 Foreign turnover ratio of the world's major telecommunications carriers



※The data of Japanese carriers is not open to the public.

Source: Annual report of each carrier

Fig.2-2 Global business development of the world's major telecommunications carriers

Country	Carriers	Business		Countries										
				Asia				America		Europe				
		fixed	mobile	Japan	China	Korea	Others	US	Others	Germany	France	UK	Spain	Italy	Others
Japan	NTT	●	●	◎		△	△	○							
	KDDI	●	●	◎		△	△		○						△
	Softbank	●	●	◎											
US	AT&T Inc.	●	●	○	○	○	○	◎	○	○	○	○	○	○	○
	Verizon	●	●	○	○	○	○	◎	○	○	○	○	○	○	○
	Sprint Nextel		●	○		○	○	◎	○	○	○	○	○	○	○
France	FT	●	●							○	◎	○	○		○
UK	Vodafone		●		△		○	△		○	○	◎	○	○	○
	BT	●		○	○	○	○	○	○	○	○	◎	○	△	○
Spain	Telefonica	●	●		△				○	○	○	○	◎	△	○
Korea	KT	●	●			◎	△								○

※◎ : Base, ○ : Local subsidiary (Shares more than 50%) , △ : Local carriers (Shares less than 50%)

Source: Original survey by MIC

Fig.2-3 NGN projects of the world's major telecommunications carriers

	Carriers	Projects	Plans for NGN	Plans for building up optical fiber access
Japan	NTT	NTT Group's Middle-term Management Strategy (2004/11 released)	The next-generation network will be built up which provides total IP connectivity from the user's device to the network. Shift 30 million customers from the existing metal wire and fixed telephone network customers (60 million) to optical fiber access and next-generation network services by 2010.	
		NTT Group's Promoting Middle-term Management Strategy (2005/11 released)	NTT East, NTT West and NTT DoCoMo Group will build a next-generation network enabling the provision of seamless IP-based services, using optical access and broadband wireless access for intra-prefectural / inter-prefectural communication, for communication between eastern / western Japan, and for communication between fixed-line phones and mobile handsets. Field trials would be begun in the second half of fiscal 2006 and NGN service will be provided in the second half of 2007.	
	KDDI	KDDI Plan for IP-based Fixed-Line Phone Network (2004/09 released)	Introducing an IP-based system to the existing fixed-line phone network from FY2005. The replacement with softswitch will be completed by the end of FY 2007.	-
		Ultra 3G Wireless Plan (2005/06 released)	Suppling IP-based high-speed data services and multimedia services by combining fixed/mobile network system incorporating new wireless systems.	-
US	Verizon	FiOS (Optical fiber access) (2004/10 released)	-	As of the end of 2005, the service was available for 3 million households. By the end of 2010, 18 million households will be covered by FTTP.
	AT&T	Project Lightspeed (Optical fiber) (2004/10 released)	In September 2005, the transition to IP-based network was announced in White Paper. The existent 22 networks will be integrated into one system.	By the end of 2008, 18 million households will be covered by FTTN or FTTP.
UK	B T	21CN (IP-based network) (2004/10 released)	In three years from 2006, IP backbone network will be built up. Customers started shifting to the IP network from 2006. Half of the customers will shift by 2008, and the shift will be completed by 2010.	-
France	F T	NExT (2005/06 released)	Transition to the IP network was referred in Management Strategy 2006-08. Access network would be integrated by 2006, and NGN/IMS architecture will be integrated by 2008.	From June 2006 to February 2007, FTTH was introduced for 14,000 households on a trial basis. The service will be begun from 2009.
Germany	D T		Subscriber telephone network will be IP based around 2012.	By the end of 2007, 2.9 million households in 50 cities will be covered by FTTC.
China	China telecom	(2005/09 started)	Started supplying fixed telephone to 470 thousand households with IP-based services.	-
	China mobile	Project for NGN (2005/10 started)	Long-distance backbone network covering 31 provinces and provincial backbone network will be IP-based network. Subscriber access network of provincial local network will be (re) built up.	-
Korea	KT	BcN (IP-based network) (2004/06, MIC)	From 2006 to 2007, IP-based long-distance network will be built up. From 2008 to 2010, IP-based local network will be built up.	In December 2006, KT announced that country-wide subscriber telephone network will shift to FTTH by 2010. *Korea promotes WiBro as national policy.

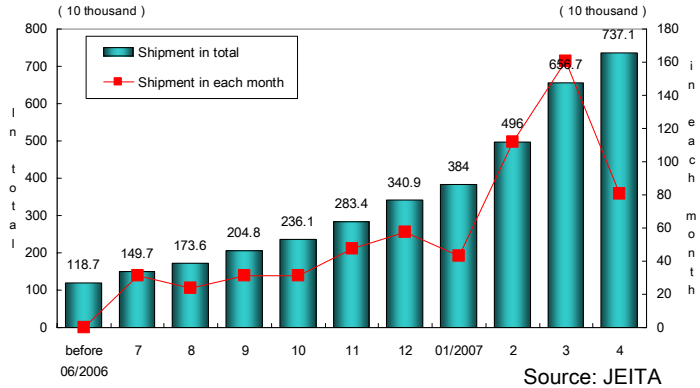
Source: MIC

2-1 International Competitiveness of ICT Industry
(1) Globalization of ICT Network (NGN)

➢Establishment of NGN is developing globally in the field of wireless telecommunications, digital broadcasting and telecommunications/broadcasting convergence. Standardization groups in Asia, Europe, and the US are working on global standardization of NGN under ITU-T (Fig. 2-4, 2-5).

➢Development of mobile phone systems standardization following the third generation is in progress. Concerning terrestrial digital broadcasting, three standards, such as Japanese, European, and US standards are adopted around the world (Fig. 2-6, 2-7).

Fig.2-4 Shipments of one-seg (one-segment broadcasting) mobile handset



Source: JEITA

Fig.2-5 International Framework of global standardization for NGN

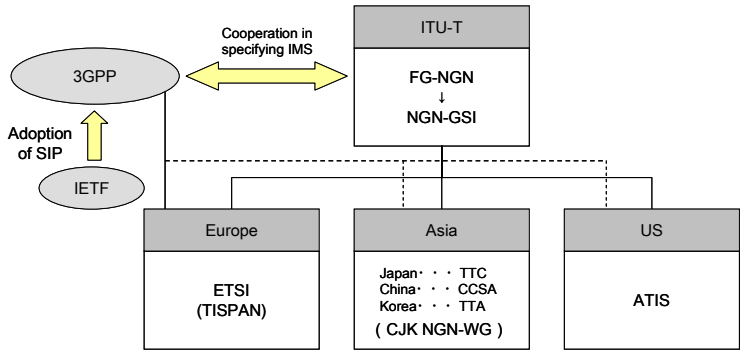
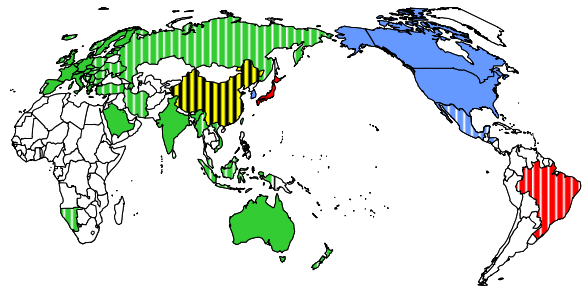


Fig.2-6 Mobile phone system and its adoption/development

Generation	Maximum data transmission speed	Major systems	Maximum data transmission speed	Adopted/Developing status Japan	US	Europe
1G	(Analogue telecommunication)	NTT system	-	○		
		TACS	-	○		○
		NMT	-			○
		AMPS	-		○	
2G	around 10kbps	PDC	~ 9.6kbps	○		
		cdmaOne	~ 14.4kbps	○	○	△
		GSM	~ 14.4kbps		○	○
		TDMA	~ 9.6kbps		○	
2.5G	10- 100kbps	PDC-P	~ 28.8kbps	○		
		GPRS/EDGE	~ 115.2kbps		○	○
3G	around 2Mbos	CDMA2000 1x	~ 144kbps	○	○	△
		W-CDMA	~ 2Mbps	○	○	○
		CDMA2000 1x EV-DO	~ 2.4Mbps	○	○	△
3.5G	around 100Mbos	HSPA(HSDPA/HSUPA)	~ 14.4Mbps	○	○	○
		EV-DO Rev.A/B	~ 10Mbps	○	○	
3.9G	More than 100Mbps	LTE	(Under development)	(○)	(○)	(○)
		UMB	(Under development)	(○)	(○)	
4G	More than 1Gbps (Quasi-stationary)	Undecided	(Under development)	(○)	(○)	(○)

△ : Adopted in part of East Europe ○ : Adopted (○) : Will be adopted

Fig.2-7 The world's terrestrial digital television broadcasting standards



●:ISDB-T (Japan) ●:DVB-T (Europe) ●:ATSC (US)、●:China (Original)
(※) Countries with stripe are planning for adoption

Source: OECD reports, etc.

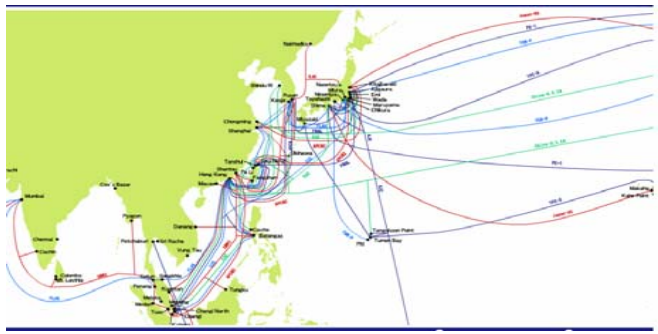
2-1 International Competitiveness of ICT Industry
(3) Globalization of ICT Network (Offshoring-1)

➢On the development of a global network around Japan and the growth of the software service industry in China and India, offshoring has rapidly developed.

➢Large capacity submarine cable beyond 10 Gbps has been laid from Japan to China, Southeast Asian countries, partly in West India and across the Pacific Ocean. Large capacity and low charge international lines have increased the use of international IP-VPN between Japan and China (Fig. 2-8, 2-9).

➢In India and China which are major offshoring destination countries, the software service industry has rapidly grown (Fig. 2-10, 2-11).

Fig.2-8 Submarine cable around Japan



Source: KDDI

Fig.2-9 Number of companies which use global inter-company network services between Japan and China

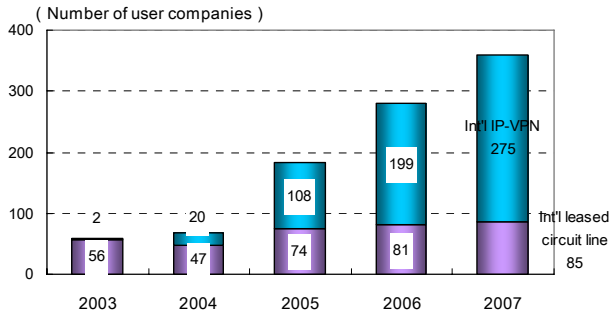


Fig.2-10 Annual turnover of software service industry in China and India

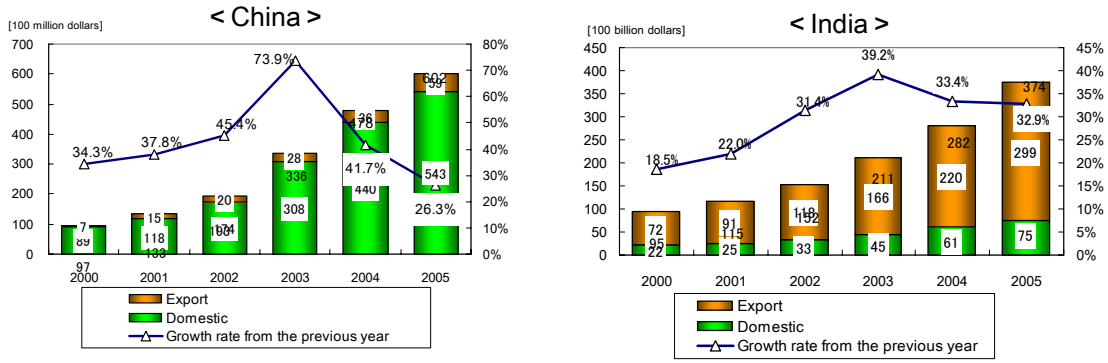
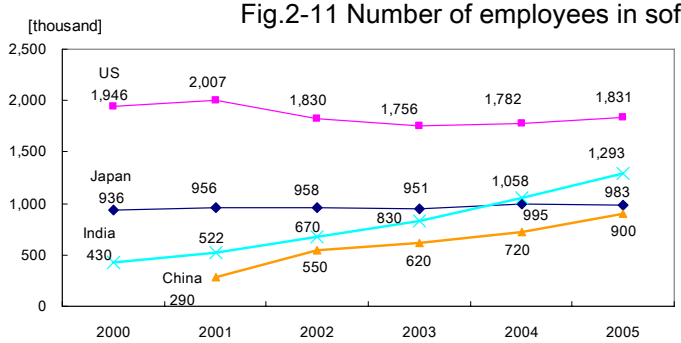


Fig.2-11 Number of employees in software service industry



Source:
Survey on Economic Analysis of ICT (MIC) (Japan, US)
Chinese software industry association (China)
NASSCOM (India)

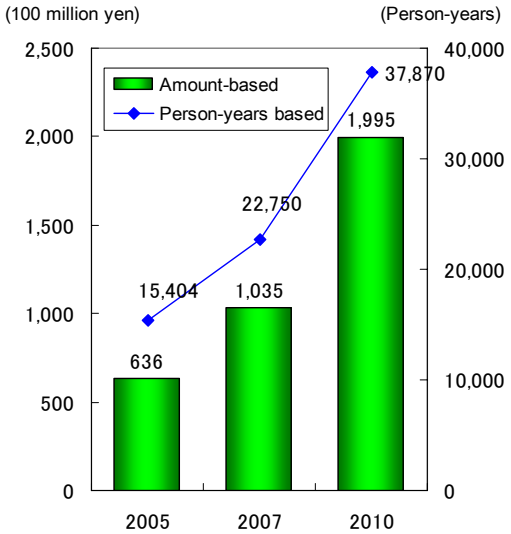
2-1 International Competitiveness of ICT Industry
(3) Globalization of ICT Network (Offshoring-2)

➢Japan's software offshoring market size was 63.6 billion yen in 2005 and will reach around 200 billion yen in 2010 (Fig. 2-12).

➢There is a shortage of domestic software engineers. One of the major purposes of offshoring is to offset the shortage (Fig. 2-13).

➢Therefore, as long as the increase of software development remains larger than that of offshoring, it is expected that an employment decrease of domestic software engineers will not happen due to an increase of offshoring (Fig. 2-14).

Fig.2-12 Market size of Japan's software offshoring



(※) The data of 2007 and 2010 are estimated by companies which do offshoring and answered their offshoring size in the inquiry.
(51 companies in 2005, 64 companies in 2007, 69 companies in 2007)

Fig.2-13 Main purposes of offshoring of Japanese companies

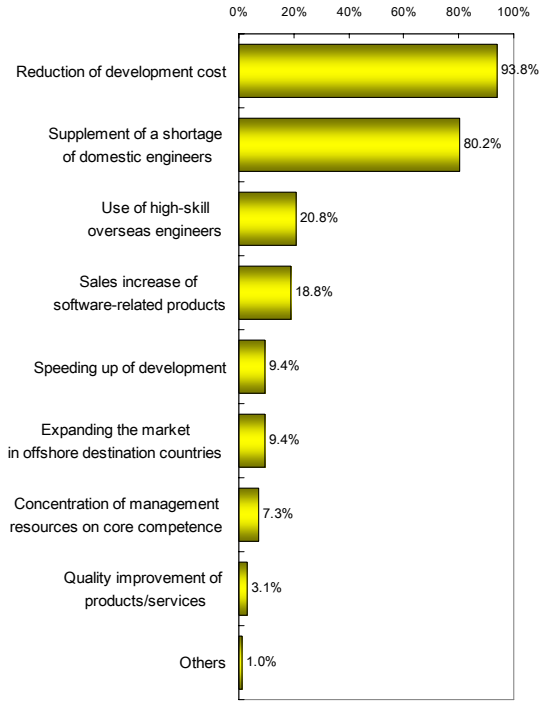
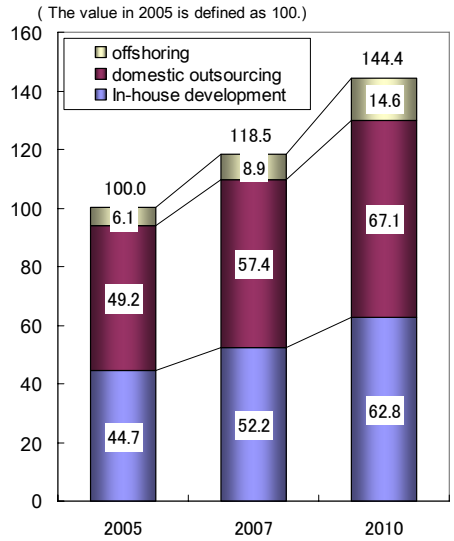


Fig.2-14 Market size of Japan's software development



(※) The data of 2007 and 2010 are estimated by companies which answered size of in-house development, domestic outsourcing and their offshoring size in the inquiry.
(102 companies including companies which do not do offshoring)

2-1 International Competitiveness of ICT Industry
(3) Globalization of ICT Network (Offshoring-3)

➢The main offshore destination country of Japan is China (about 80%), and that of the US is India (about 95%). Japan tends to emphasize communication and cost, while US tends to emphasize technological skills (Fig. 2-15).

➢Japan's achievement of cost reduction by offshoring is about 25% which is lower by 10 points than the estimation before the implementation (Fig. 2-16).

Fig.2-15 Comparison of offshoring between Japan and US

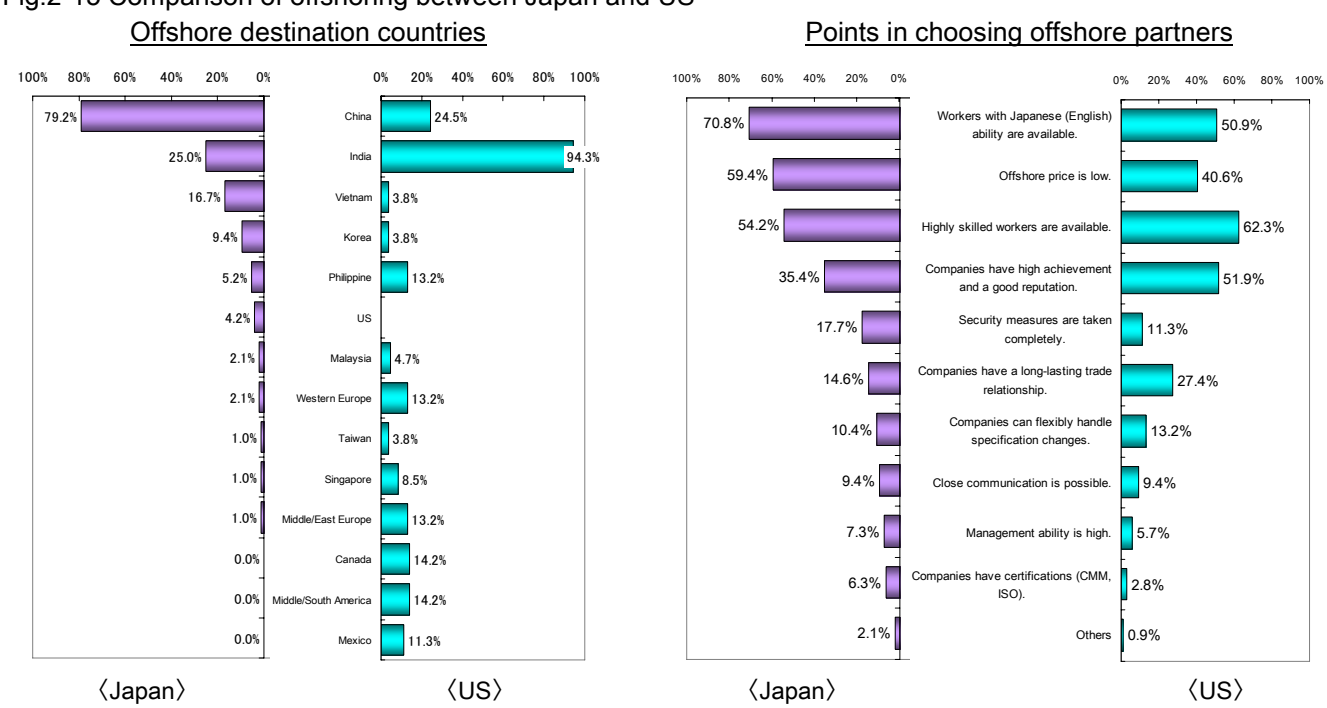
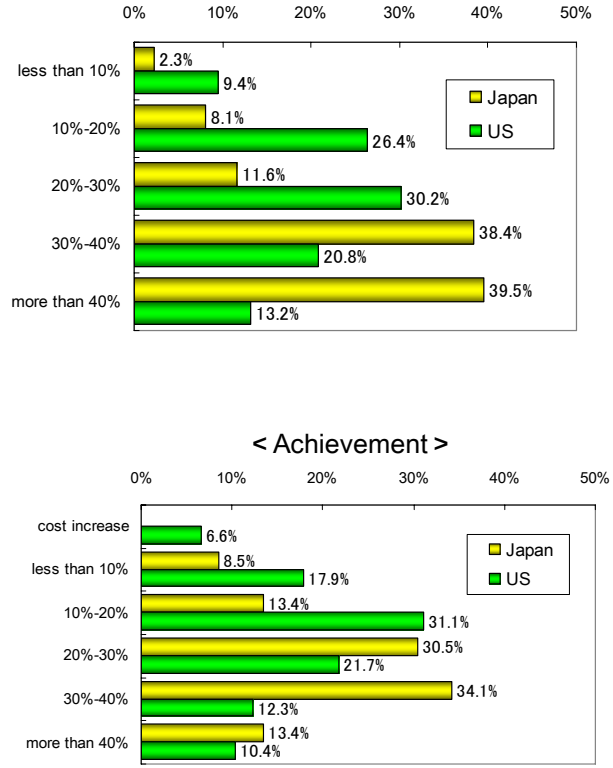


Fig.2-16 Cost reduction by offshoring



2-1 International Competitiveness of ICT Industry
(4) International Competitiveness of ICT Industry in Japan -1

➢Major ICT vendors' average profit rate for Japan is lower than that of the US, Europe and Korea in every sector of equipment, device, and software/solution (Fig. 2-17, 2-18).

➢Major ICT vendors' average ratio of R&D expenses to turnover for Japan is lower than that of the US and Europe. That of Korea has increased annually, reaching the same level as that of Japan in 2005 (Fig. 2-19, 2-20).

Fig.2-17 Average profit rate of the world's major ICT vendors (FY1996-FY2005)

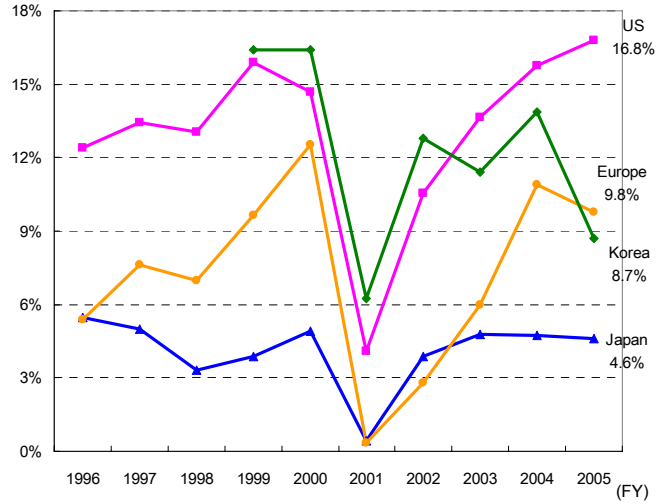


Fig.2-18 Average profit rate of the world's major ICT vendors (FY1996-FY2005)

	In total	Reference		
		terminal/ equipment	devices	software /solution
Japan	4.1%	4.7%	2.5%	5.6%
US	13.0%	7.2%	20.2%	19.6%
Europe	7.2%	7.1%	4.7%	13.0%
Korea	12.3%	8.4%	22.9%	-

Fig.2-19 Average ratio of R&D expenses to turnover of the world's major ICT vendors (FY2001-FY2005)

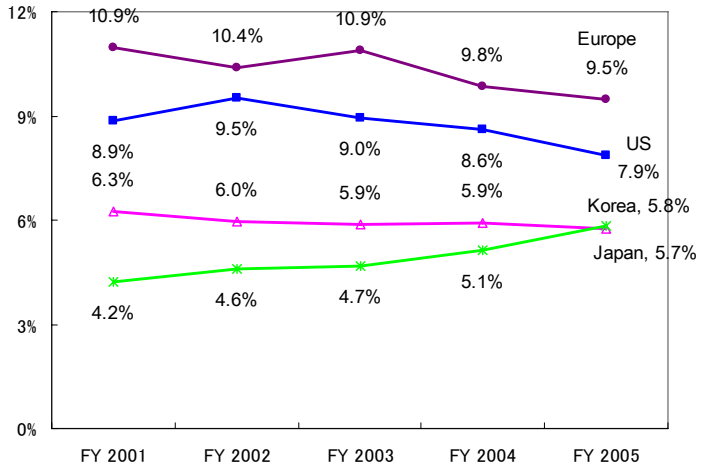


Fig.2-20 Average ratio of R&D expenses to turnover of the world's major ICT vendors (FY2001-FY2005)

	In total	Reference		
		terminal/ equipment	devices	software/ solution
Japan	5.9%	-	-	-
US	8.7%	6.5%	14.1%	13.9%
Europe	10.3%	9.6%	18.0%	12.4%
Korea	5.0%	-	-	-

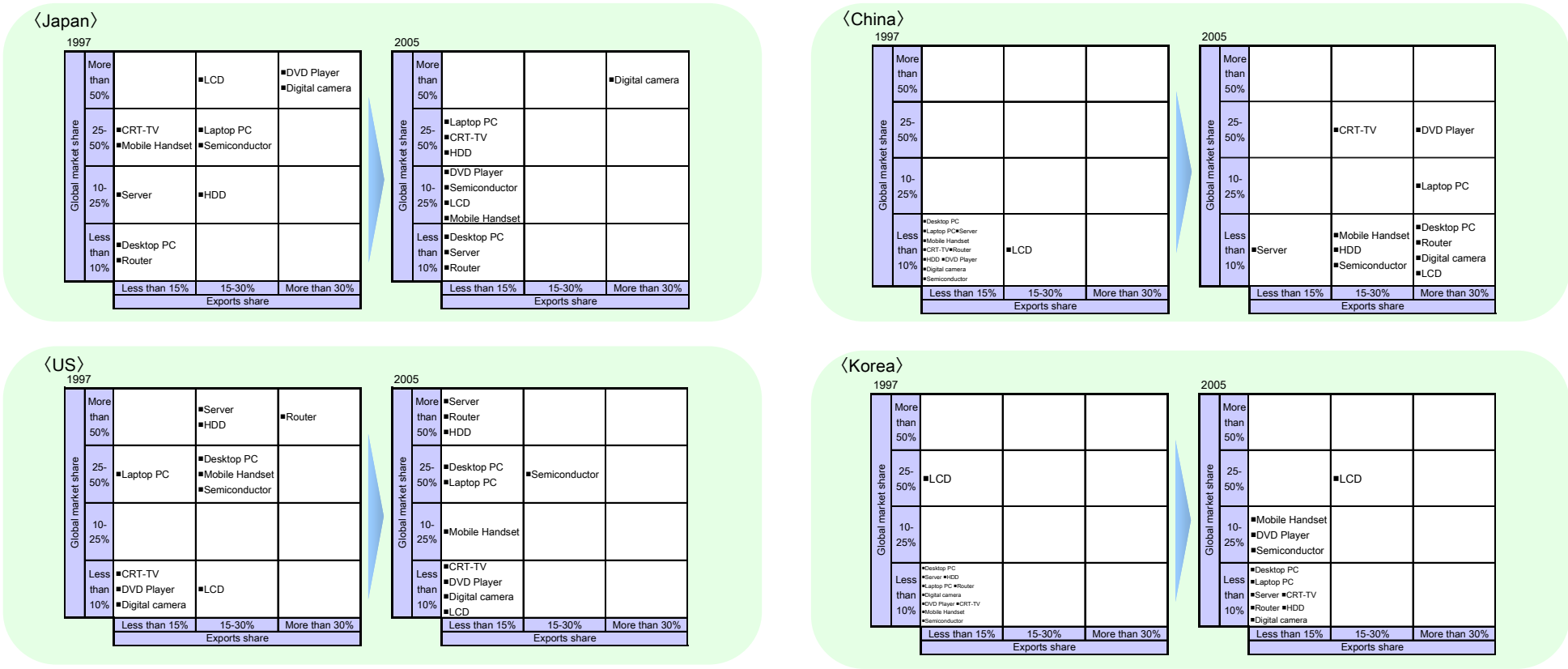
Fig.2-17 ~ 2-20 Source: Annual report of each vendor

2-1 International Competitiveness of ICT Industry
(4) International Competitiveness of ICT Industry in Japan -2

➢Japan's global market share and exports share declined in almost all ICT-related products between 1997 and 2005. This implies the decline of Japan's corporate competitiveness and locational competitiveness as a production base.

➢US locational competitiveness declined, while its corporate competitiveness is maintained. China rapidly increased its locational competitiveness with the establishment of many production bases of foreign vendors by the development of the international division of labor. Korea increased its corporate competitiveness in some products.

Fig.2-21 Changes in global market share and exports share in major ICT equipments



※Exports share represents a share of exports of each country in total exports of the world's major countries

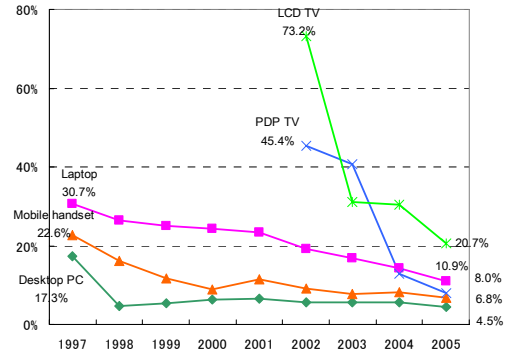
Source: Data by research institutes and World Trade Atlas (GTI)

2-1 International Competitiveness of ICT Industry
(5) Business Development of Japanese ICT Vendors

➢Regardless of the decrease of the weight of the Japanese market in the global market, the ICT vendors of Japan tend to be domestic market-oriented compared to those of the US and Europe (Fig. 2-22, 2-23).

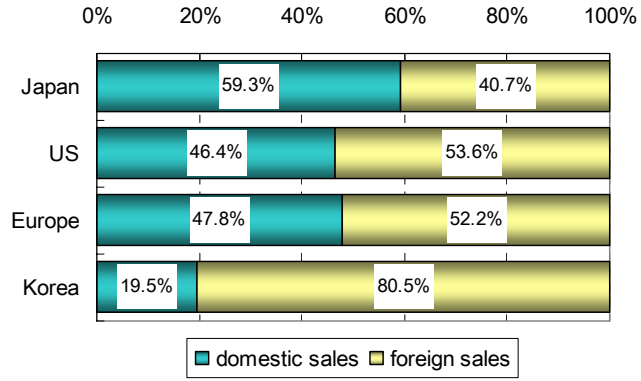
➢ICT vendors of Japan tend to develop their business in a wider product range than those of the US and Europe. This makes it possible to spread business risk and build up a wide variety of technologies, whereas, small but many business units increase the adjustment costs among them (Fig. 2-24).

Fig.2-22 Weight of the Japanese market in the global market



Source: Fuji Chimera Research Institute

Fig.2-23 Ratio of domestic/foreign sales of the world's major ICT vendors



Source: Financial reports of each vendor

Fig. 2-24 Main products of the world's major ICT vendors

	Vendors \ Products	Communication-related products						Video-related products							Devices				Software /Solution	
		Desktop PC	Laptop PC	Server	Router	Switch	Mobile handset	CRT-TV	LCD-TV	PDP-TV	DVD player/DVD recorder	Digital camera	Printer	Copy machine	HDD	Semiconductor	LCD	PDP	Pre-packaged software	System integration
Japan	Hitachi	○	○	○	○	○	○	○	○	○	○	○			○	○	○	○	○	○
	Matsushita (Panasonic)		○		○		○	○	○	○	○	○	○	○		○	○	○	○	○
	Sony	○	○	○			△	○	○		○	○	○			○	△			○
	Toshiba	○	○	○	○	○	○		○		○	○	○	○	○	○	○		○	○
	NEC	○	○	○	○	○	○						○	○		○	○	○	○	○
	Fujitsu	○	○	○	○	○	○		△	△			○		○	○		△	○	○
	Canon											○	○	○					○	○
	Mitubishi	○	○	○		○	○	○	○		○		○			○	○		○	○
	Sharp	○	○				○	○	○		○		○	○		○	○		○	○
	Sanyo						○	○	○	○	○	○				○				
	Ricoh											○	○	○		○			○	○
	Seiko Epson	○	○	○					○			○	○	○		○	○		○	○
	Kyocera						○						○	○			○		○	○
US	IBM			○									△			○			○	○
	Hewlett-Packard	○	○	○	○	○			○	○		○	○	○					○	○
	Dell	○	○	○		○			○				○							○
	Microsoft																		○	
	Intel															○				
	Motorola			○	○		○												○	○
	Cisco Systems			○	○	○													○	○
	EDS																			○
	Xerox												○	○		○			○	○
	CSC																		○	○
	Oracle																		○	○
	Kodak											○	○							
	Apple	○	○	○			○												○	△
	Texas Instruments															○				
	Sun Microsystems	○	○	○		○													○	○
	EMC																		○	○
	Seagate Technology														○					
Europe	Siemens (GE)	△	△	△		○			△										△	○
	Alcatel-Lucent (FR)				○	○	○												○	○
	Ericsson (SW)			○	○	○	○												○	○
	Nokia (FI)						○												○	
	Philips (NE)						△		○	○	○					△	△			
	Infineon Technologies (GE)															○				
	STMicroelectronics (IT/FR)															○				
	SAP (GE)																		○	○
	Capgemini (FR)																			○
Korea	Samsung	○	○	○			○	○	○	○	○		○	○	○	○	○	○		
	LG Electronics	○	○				○	○	○	○	○						△	○	△	△

*○ represents the vendor does business in consolidated subsidiaries.
*△ represents the vendor does business in non-consolidated subsidiaries.
*System integration includes only services which cost other fees than hardware, software, and incidental services.

Source: Original survey by MIC

2-1 International Competitiveness of ICT Industry
(6) Japanese ICT Vendors' Technology Competitiveness, R&D, and Human Resources

➢Japanese ICT vendors are competitive in product areas where material technologies, optical/electronic device technologies, equipment technologies, and technologies for metal dies are important. Also, the more the products have important element technologies, the more technologically competitive Japanese ICT vendors are (Fig.2-25, 2-26).

➢The number of graduates from ICT-related departments in Japan has been smaller than that in the US, China and India. It is essential for Japan to strengthen professional education system after university education to keep and improve technological competitiveness in the ICT sector for the future (Fig.2-27).

Fig.2-25 Importance of each element technology in products with technological competitiveness

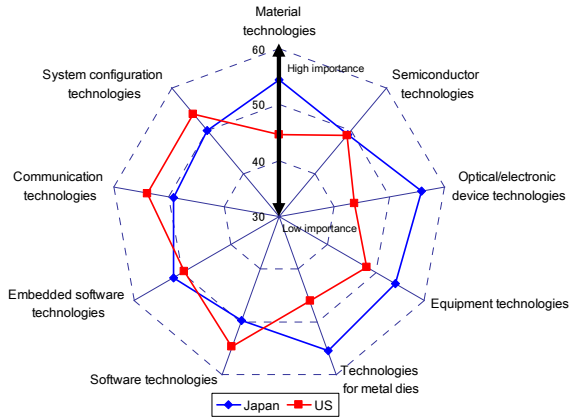


Fig.2-26 Number of important element technologies in products with technological competitiveness

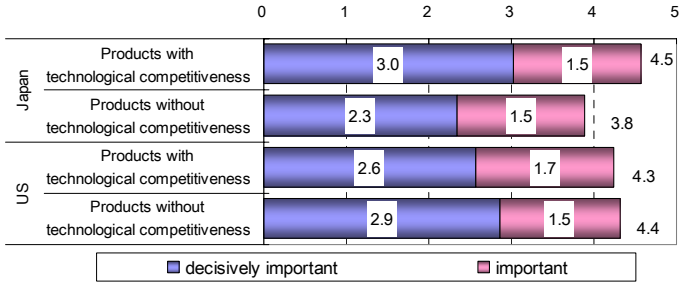
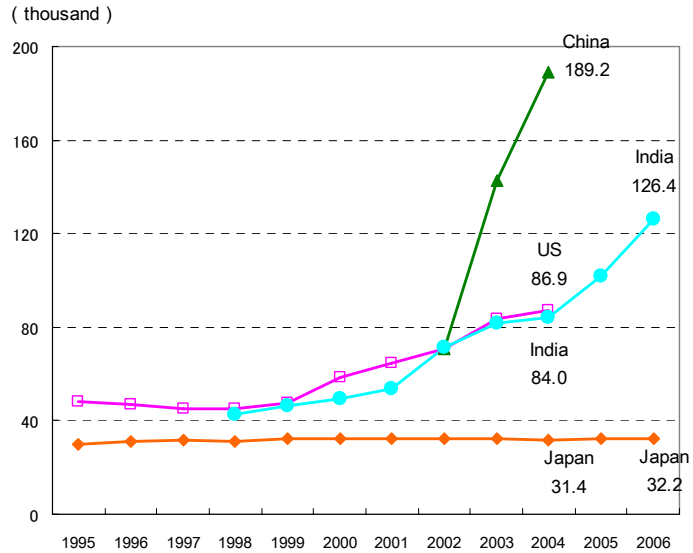


Fig.2-27 Number of graduates from ICT-related department



Source:
Ministry of Education, Culture, Sports, Science and Technology (Japan)
Department of Education (US)
Chinese software industry association (China)
NASSCOM (India)

2-1 International Competitiveness of ICT Industry
(7) Network Equipments (Router/Switch)

➢Cisco Systems accounts for around 70% of the global market share in both routers and switches. ICT vendors of the US and Europe have next-best positions, while the share of Japanese ICT vendors in the global markets is extremely small (Fig.2-28, 2-29).

➢Cisco's large share is due to an advantage in terms of technology by M&A and active commitment in standardization, and making use of "network externalities" and "switching cost" (Fig.2-30).

➢As the demand for high-end products is expected to increase, Japan, as the most advanced country in terms of broadband infrastructure, will become a test bed for products with the highest technology, which will create important opportunities for Japanese ICT vendors (Fig.2-31, 2-32).

Fig.2-28 Share in the global router market (shipment amount in 2006)

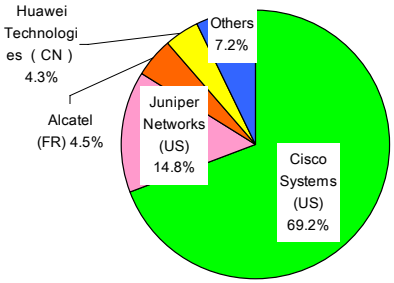


Fig.2-28 Share in the global switch market (shipment amount in 2006)

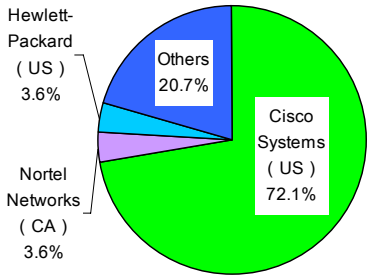
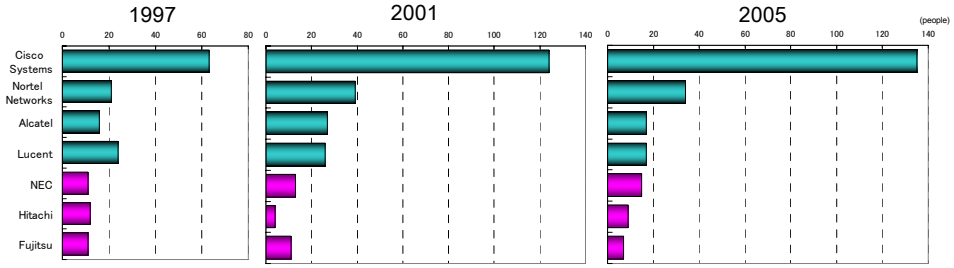


Fig.2-28, 2-29 Source: Dell' Oro Group

Fig.2-30 Number of participants in IETF (Internet Engineering Task Force)



Source: IETF

Fig.2-31 Trends in router market (capacity)

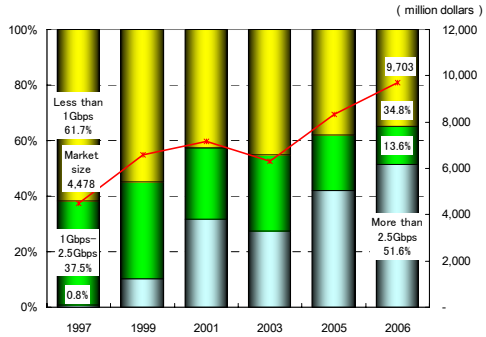


Fig.2-32 Share in the global router market (more than 2.5Gbps)

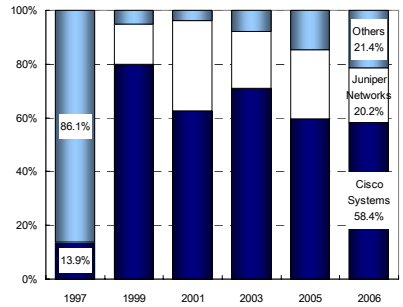


Fig.2-31, 2-32 Source: Dell'Oro Group

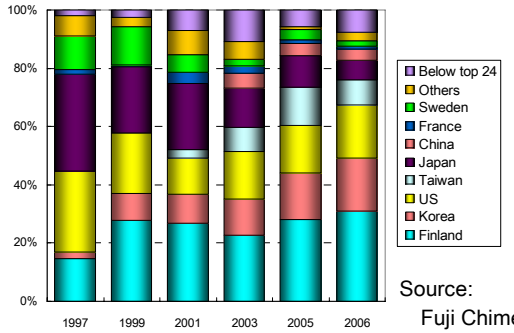
2-1 International Competitiveness of ICT Industry
(8) Mobile Handset

➢Finland accounts for the largest share in the global market for mobile handsets. Korea's share has increased, while Japan's share in the same market has decreased (Fig.2-33).

➢The center of mobile communications market growth in the world is shifting from advanced countries to developing countries. The global market is expanding more rapidly than the Japanese market (Fig.2-34).

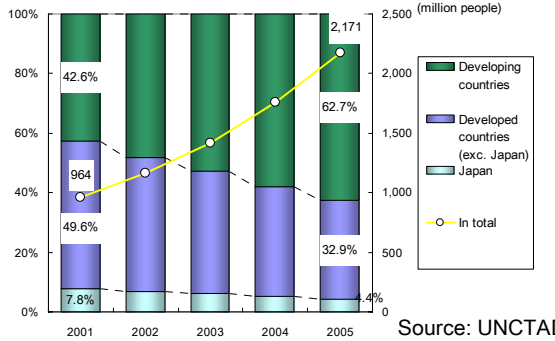
➢GSM originally developed in Europe is now the de facto global standard in the second generation mobile system. In the GSM mobile handset market, Japanese ICT vendors can hardly maintain share. However, Japanese vendors precede other countries in the third generation mobile handset market. It is important for them to turn its dominance to the future strategy (Fig.2-35~2-37).

Fig.2-33 Share in the global mobile handset market (Output)



Source:
Fuji Chimera Research Institute

Fig.2-34 Number of worldwide mobile subscribers



Source: UNCTAD

Fig.2-35 Share in the global mobile handset market (Output in 2006)

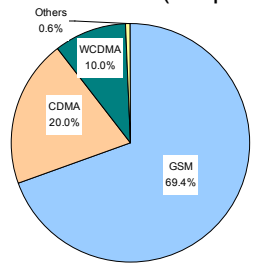


Fig 2-36 Share in the global GSM mobile handset market (Output in 2006)

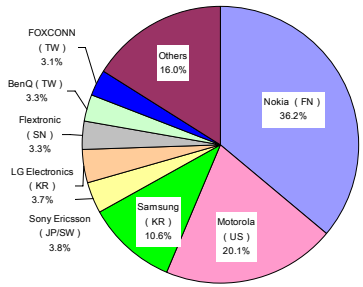


Fig 2-37 Share in the global W-CDMA mobile handset market (Output in 2006)

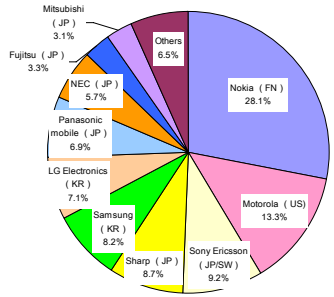


Fig.2-35 ~ 37 Source: Fuji Chimera Research Institute

2-1 International Competitiveness of ICT Industry
(9) Flat Screen TV/Flat Panel Display -1

➢Triggered by the technological development in LCD (Liquid Crystal Display) and PDP (Plasma Display Panel), the flat screen TV market is expanding worldwide (Fig.2-38).

➢Korea and Taiwan have increased their share in the global LCD market, while Japan's share has decreased. In the global PDP market, Japan is competing against Korea for market share (Fig.2-39, 2-40).

Fig.2-38 Share in the global TV market

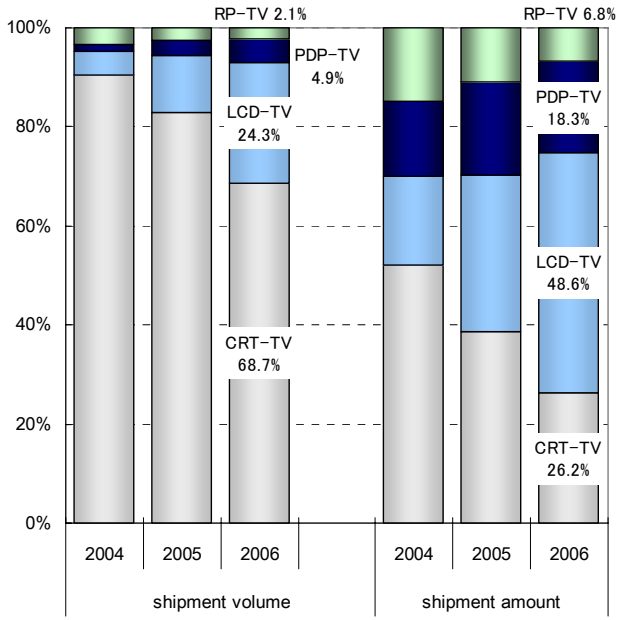


Fig.2-39 Share in the global LCD market (shipment volume)

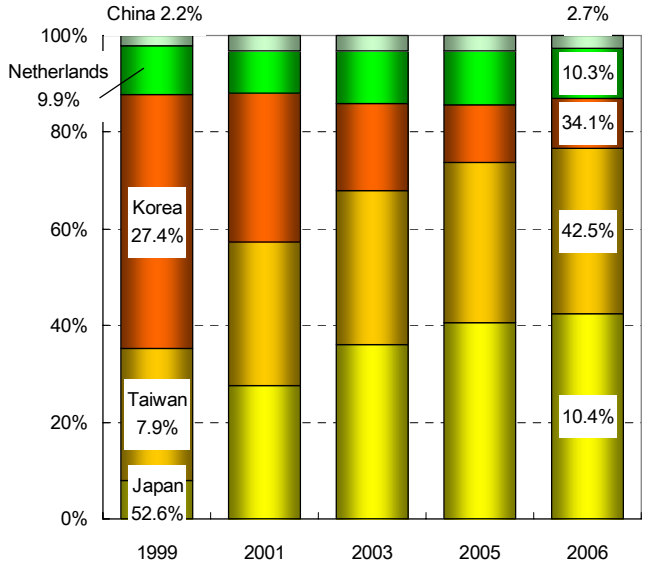


Fig.2-40 Share in the global PDP market (shipment volume)

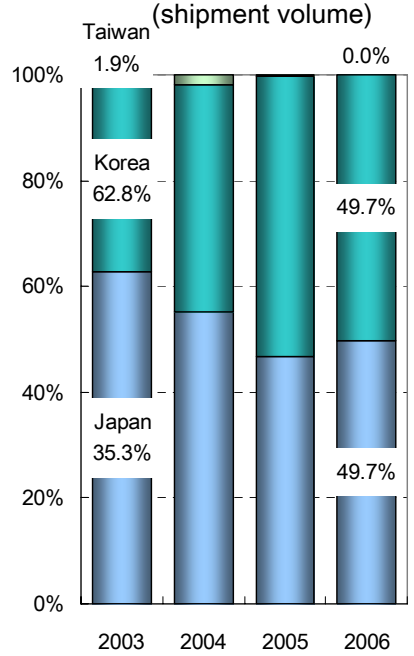


Fig.2-38 ~ 2-40 Source: DisplaySearch

2-1 International Competitiveness of ICT Industry
(9) Flat Screen TV/Flat Panel Display -2

➢As the panel size becomes larger, the proportion of PDP-TV shipments for screens over 50 inches has increased since 2004 (Fig.2-41).

➢One of the future options for Japanese vendors is to strength cooperation with material manufacturers with high international competitiveness in order to handle a rapid technology cycle and price reductions (Fig.2-42, 2-43).

Fig.2-41 Share in the global TV market (shipment volume)

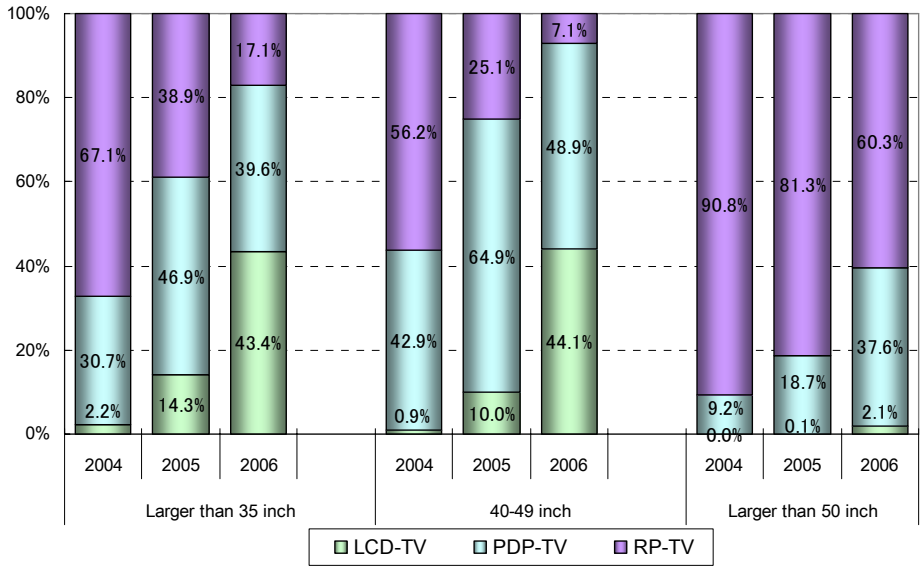


Fig.2-42 Price change of flat panel display for television

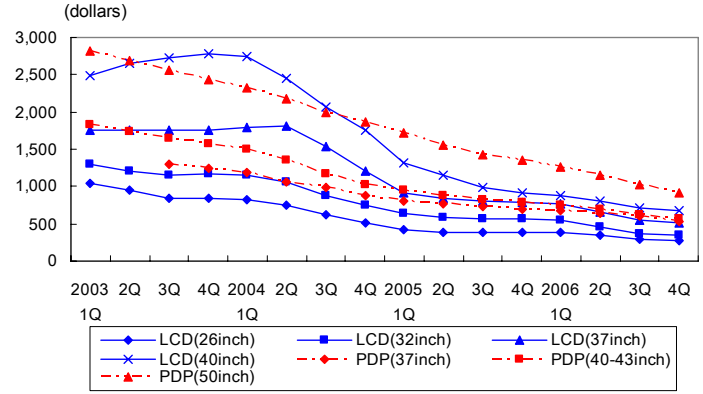
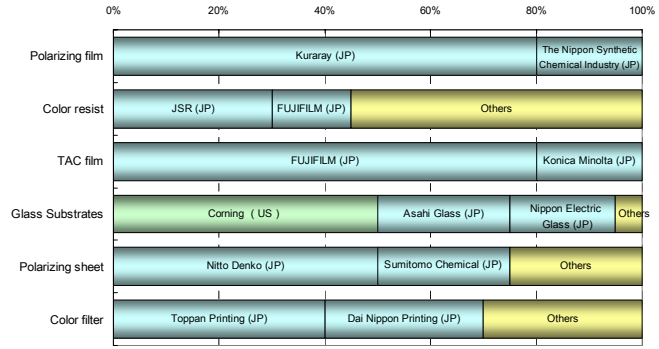


Fig.2-41, 2-42 Source: DisplaySearch

Fig.2-43 Share in the global LCD materials and components market



Source: Nikkei newspapers (2007/04/04)

2-1 International Competitiveness of ICT Industry
(10) Semiconductor -1

➢Japan's share of the global semiconductor market has decreased. Korea has increased its share (Fig.2-44).
➢Japanese ICT vendors accounted for an overwhelming share in the global memory market in the 1980s. Afterwards, they fell behind other countries in low-cost production areas such as a high yield rate and fine-processing technology, and large-scale investment capability. In 2006, the share of two Korean vendors comes to more than 40% of the global DRAM market and the global flash memory market (Fig.2-45, 2-46).

Fig.2-44 Share in the global semiconductor market (Sales)

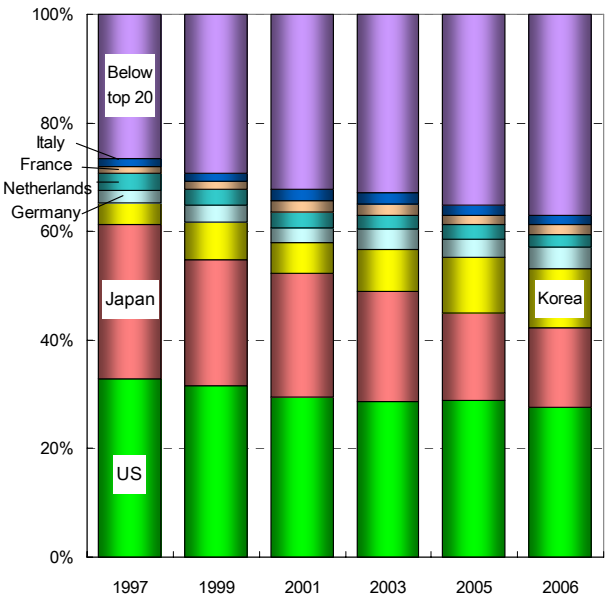


Fig.2-45 Share in the global DRAM market (Sales in 2006)

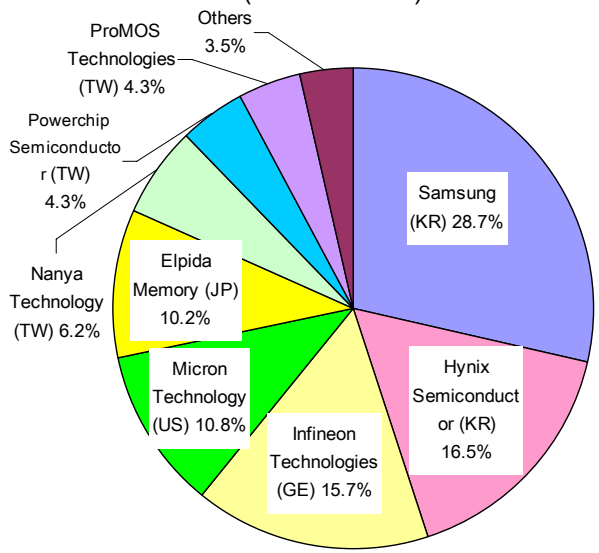


Fig.2-46 Share in the global Flash Memory market (Sales in 2006)

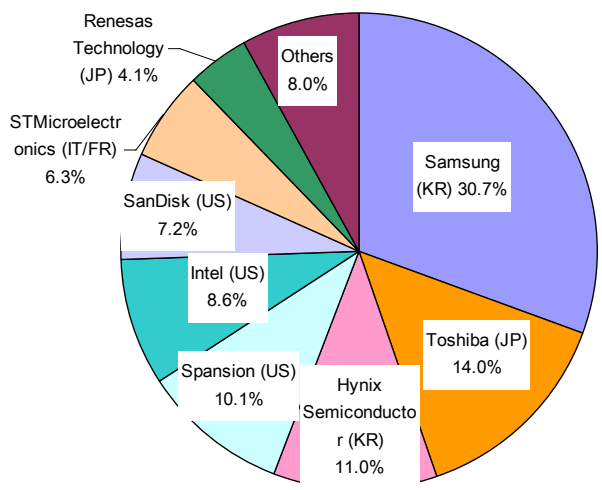


Fig.2-44 ~ 2-46 Source: Gartner Dataquest

2-1 International Competitiveness of ICT Industry
(10) Semiconductor -2

➢US vendors are competitive in the global MPU market as they preceded other countries in computer development. The shares of Intel and AMD add up to more than 90% (Fig.2-47).

➢The system LSI market is expected to expand by an increasing demand for digital home appliances. Major Japanese semiconductor vendors with home appliances have an advantage in production for their own products, but they should shift the focus from ASIC (Application Specific IC) to ASSP (Application Specific Standard Product) whose demand is expected to increase (Fig.2-48, 2-49).

Fig.2-47 Share in the global MPU market (Sales in 2006)

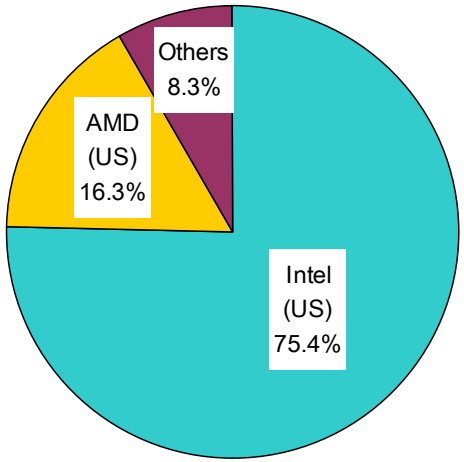


Fig.2-48 Share in the global ASD (Application Specific Device) market (Sales in 2006)

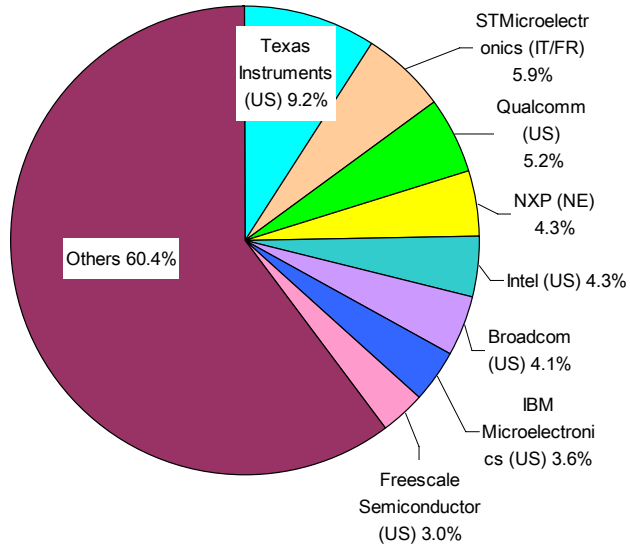


Fig.2-49 Share in the global ASD market (Sales in 2006)

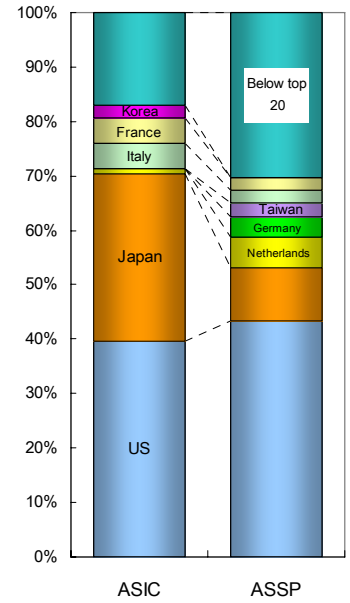
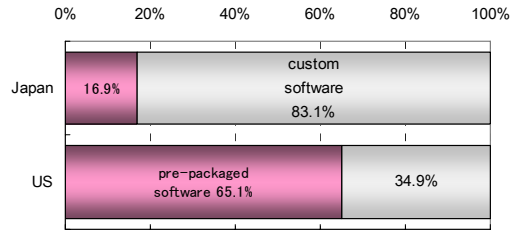


Fig.2-47 ~ 2-49 Source: Gartner Dataquest

2-1 International Competitiveness in ICT Industry
(11) Software

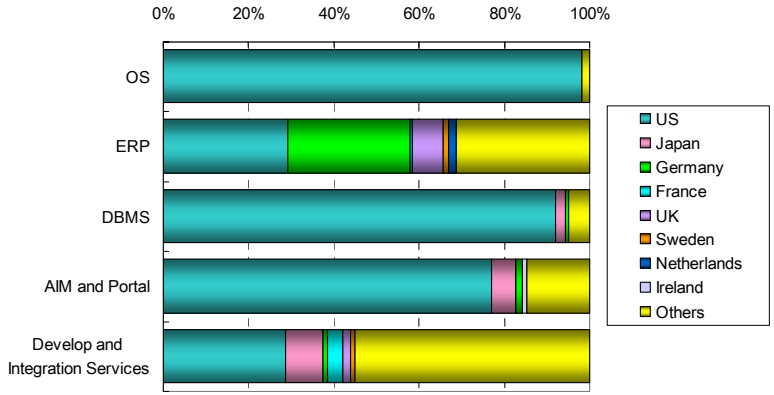
➢Japanese ICT vendors account for a small share in both the global and domestic pre-packaged software market. As they sell mostly custom software, they cannot enjoy the merit of mass production and subsequent high productivity (Fig.2-50~2-53).
➢The spread of OSS (Open Source Software) and the rise of SaaS (Service as a Software) are new trends by ubiquitous network development. They bring the possibilities of change to the existent business model in the software industry in that OSS will cause a rapid price reduction and SaaS will take the small and middle enterprises in as new customers (Fig.2-54).

Fig.2-50 Share of software sales



Source: METI (Japan)
Department of Commerce (US)

Fig.2-51 Share in the global software market (2005)



Source: Gartner Dataquest

Fig.2-52 Share in domestic ERP market (Sales in 2005)

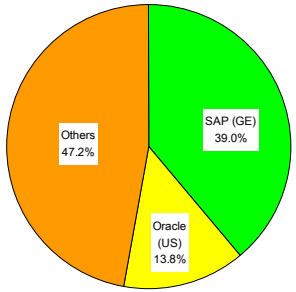


Fig.2-53 Share in domestic DBMS market (Sales in 2005)

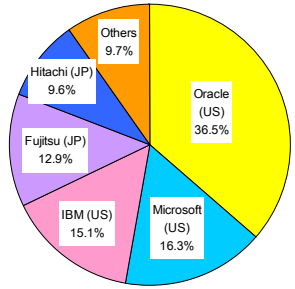
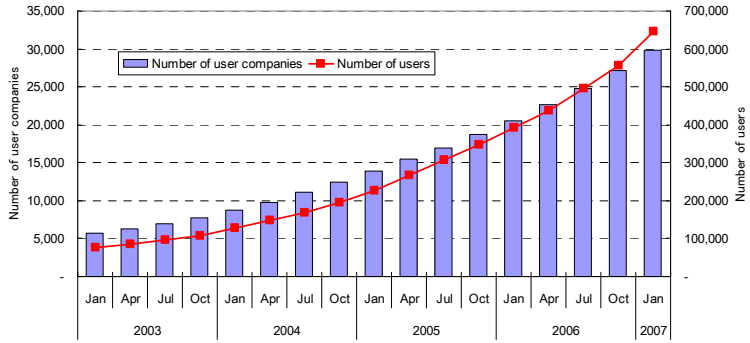


Fig.2-52, 2-53 Source: Gartner Dataquest

Fig.2-54 Number of companies and users of Sales force



Source: Salesforce.com

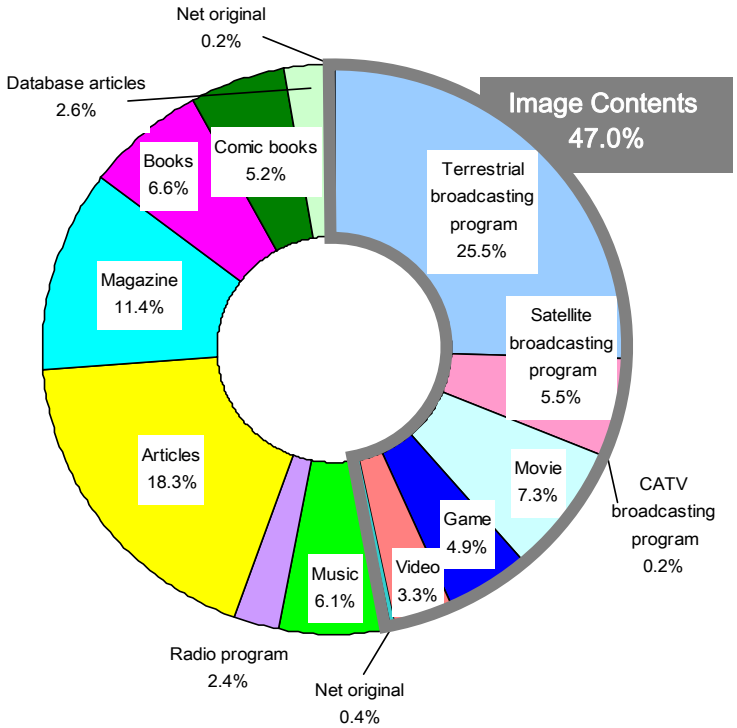
2-1 International Competitiveness of ICT Industry
(12) Contents

➢The Japanese contents market is about 11.3 trillion yen. Broadcasting contents accounts for about 70% of image contents (Fig.2-55).

➢Japanese broadcasters develop their global business. Japanese broadcasting content has been broadcast overseas (Fig.2-56, 2-57).

➢In some countries, governments support the broadcasters' global business development. It is necessary for Japan to strengthen the competitiveness in this sector through opening up new markets and new channels, and human resources development.

Fig.2-55 Share of domestic contents market



Source: Survey on Media Content Production and Distribution (IICP, MIC)

Fig.2-56 Global business development of NHK

Programs/News
Providing news programs (9 countries, 9 broadcasters, 146 cases, 24 hrs, 20 mins) "NHK Special" (5 countries, 5 broadcasters, 8 cases, and 7 hrs, 52 mins)
Providing overseas for free
Providing as cultural grant aid of MOFA (4 countries, 1,341 programs) (Bhutan, the Dominican Republic, Swaziland, and Niger) Providing through Japan Foundation (36 countries, 1,118 programs) (Asia, Middle and South America, Africa and East Europe, etc.)
Selling the rights to broadcast
Providing 728 titles, 6,053 programs to worldwide broadcasters in 39 countries/areas

Fig.2-57 Global business development of Japanese commercial broadcasters

Japanese commercial broadcasters are developing exports of their broadcasting contents. The revenue in total is estimated at about 5 billion yen.
In Taiwan, 3 channels broadcast Japanese programs. They purchase popular programs from Japanese key stations/quasi-key stations and arrange them. In Spain, 8 local channels broadcast Japanese cartoon programs which are translated into different dialects (broadcast everyday in some areas). Exports 58 programs (of these, 21 programs are cartoons). The sales overseas have increased four times in four years. Programs are sold in Asia (Taiwan, Hong Kong, Singapore) in packet form. Programs are sold in France in "format style". TFI (FR) broadcasts the program and its occupational rate was 34.7 (the top in the slot).

Fig.2-56, 2-57 Source: Final Report of the Panel on ICT International Competitiveness (MIC)

2-1 International Competitiveness of ICT Industry
(13) ICT Ventures -1

➢The number of listed ICT ventures shows a steady increase. The average turnover peaked 10 years after founding and has decreased thereafter (Fig.2-58, 2-59).

➢One of the features in Japan is that venture capital represents a much smaller investment in ventures than in the US (Fig.2-60).

※Analysis in this section is for 185 companies established after 1994 and listed in the 1st section, 2nd section, or others of the TSE, Hercules, or JASDAQ after 1999, and are either classified as ICT industry or have a core business where the Internet is indispensable.

Fig.2-58 Number of ICT ventures founded after 1994 and listed after 1999

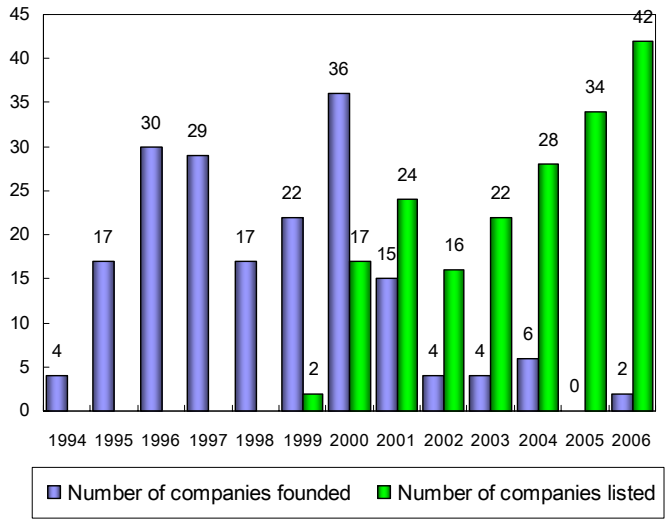


Fig.2-59 Average turnover per company in terms of years past after founding

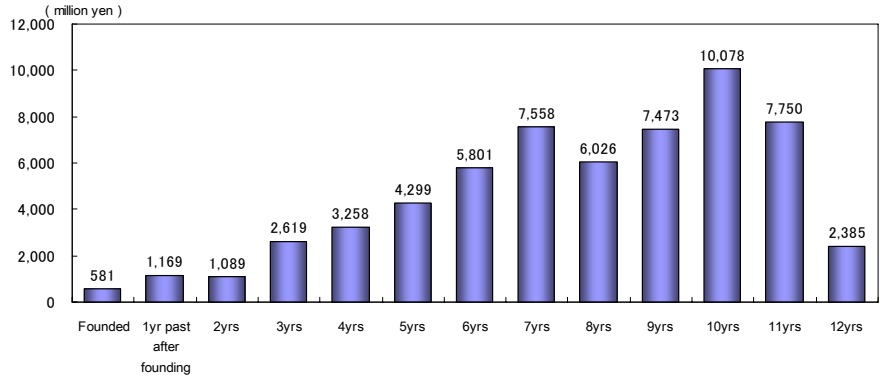
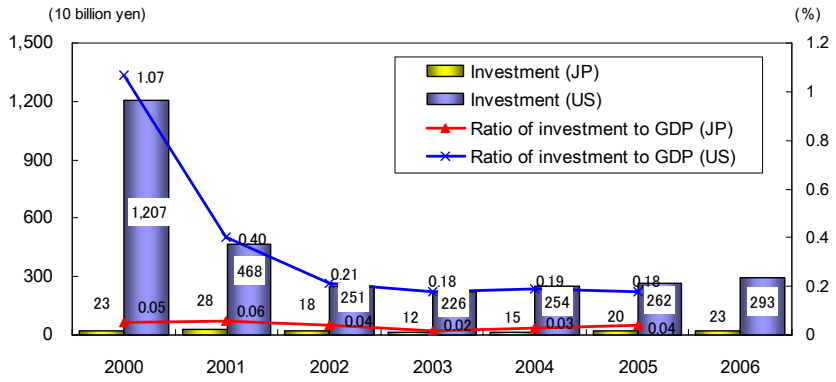


Fig.2-60 Annual investment by venture capital and its ratio to GDP



2-1 International Competitiveness of ICT Industry
(13) ICT Ventures -2

➢The major investors for ICT ventures are individuals and ICT companies. The major purchasers of their products and services are mostly ICT companies. These imply that the growth of Japanese ICT ventures depends on the existent ICT companies (Fig.2-61, 2-62).

➢In recent years, ICT ventures are increasingly developing on a global scale. For example, the number of affiliated companies overseas of Japanese ICT ventures has also increase (Fig.2-63).

Fig.2-61 The top shareholder of ICT ventures

	2001	2002	2003	2004	2005	2006
Number of companies	38	68	82	107	140	185
Individuals	18	39	47	50	64	91
	(47.4)	(57.4)	(57.3)	(46.7)	(45.7)	(49.2)
I C T	7	11	12	22	27	37
	(18.4)	(16.2)	(14.6)	(20.6)	(19.3)	(20.0)
Firms	3	4	4	7	8	13
	(7.9)	(5.9)	(4.9)	(6.5)	(5.7)	(7.0)
Trading company	1	1	1	2	4	9
	(2.6)	(1.5)	(1.2)	(1.9)	(2.9)	(4.9)
Foreign investor	3	3	4	4	10	9
	(7.9)	(4.4)	(4.9)	(3.7)	(7.1)	(4.9)
Ventures	0	1	2	2	4	7
	(0.0)	(1.5)	(2.4)	(1.9)	(2.9)	(3.8)
Financial institution	0	0	0	3	5	4
	(0.0)	(0.0)	(0.0)	(2.8)	(3.6)	(2.2)
Media/Advertising company	1	2	2	2	3	3
	(2.6)	(2.9)	(2.4)	(1.9)	(2.1)	(1.6)
Other financial/lease company	0	1	2	2	3	3
	(0.0)	(1.5)	(2.4)	(1.9)	(2.1)	(1.6)
Trust bank	0	1	1	0	2	2
	(0.0)	(1.5)	(1.2)	(0.0)	(1.4)	(1.1)
Holding company	1	0	0	0	0	0
	(2.6)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Others / Unknown	4	5	7	13	10	7
	(10.5)	(7.4)	(8.5)	(12.1)	(7.1)	(3.8)

(※) The upper number represents the number of shareholders.
The lower number represents its ratio to the number of companies in each year.

Fig.2-62 Major purchasers of products and services of ICT ventures

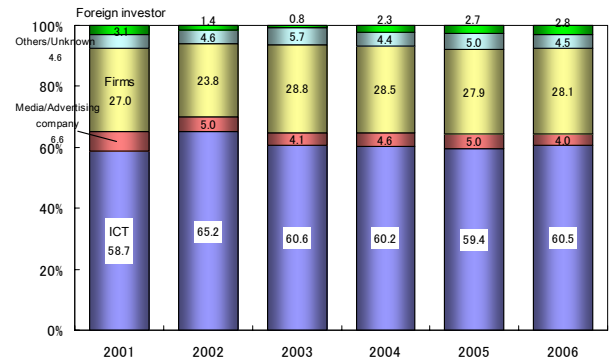
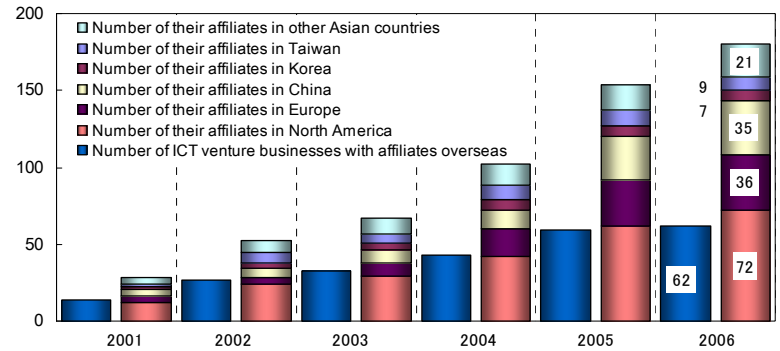


Fig.2-63 Number of ICT ventures with affiliated companies overseas and their number of affiliates



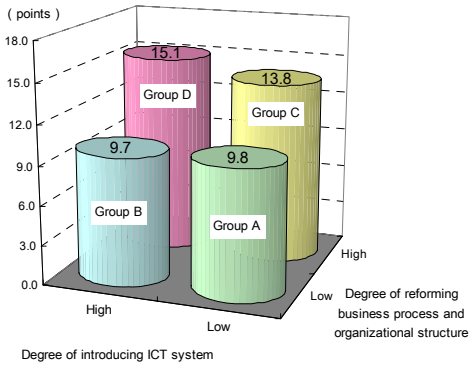
2-2 Improvement of corporate competitiveness by ICT use
(1) ICT Use and Competitiveness Improvement -1

➢The effect of introducing the ICT system is maximized when the business processes and organizational structure are reformed together (Fig.2-64).

➢Large enterprises introduce the ICT system and reform their business processes and organizational structure, whereas small and medium-sized enterprises lag behind large enterprises in the introduction of the ICT system. As a result, the effects of introducing ICT and reforming business processes and the organizational structure have the most impact in large enterprises (Fig.2-65, 2-66).

Fig.2-64 Interrelation between degree of introducing ICT system and that of reforming business processes and organizational structure

<Basic Business>



<Product Development / Marketing>

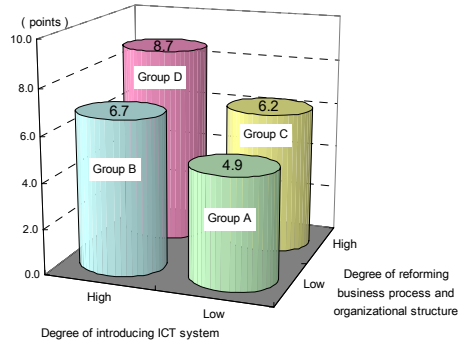


Fig.2-65 Degree of introducing ICT system and reforming business processes / organizational structure

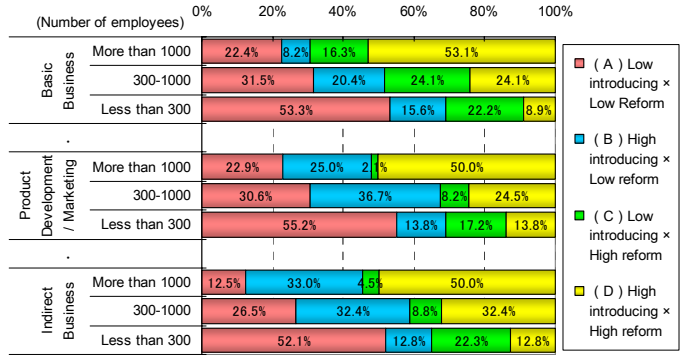
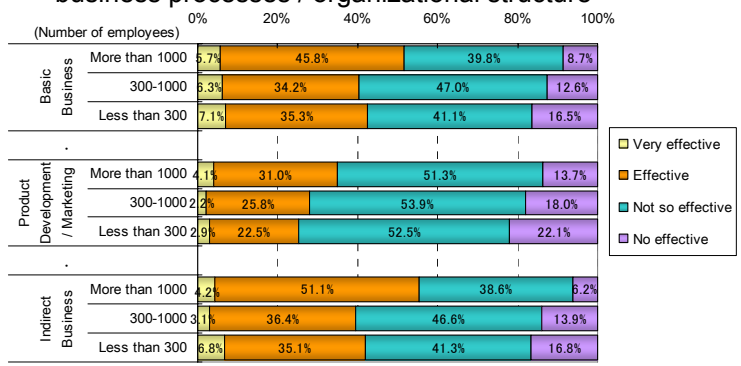


Fig.2-66 Effects of introducing ICT system and reforming business processes / organizational structure



2-2 Improvement of corporate competitiveness by ICT use
(1) ICT Use and Competitiveness Improvement -2

➢Japanese companies tend to pursue improving business efficiency and fall behind US companies in introducing the ICT system, especially in the fields directly related to market/customers. Also, Japanese companies tend not to reform organizational structure. As a result, they have not achieved an effect which leads to improved value-added (Fig.2-67~2-69).

➢The proportion of companies which place CIO in the US is much higher than that in Japan. Also, Japanese companies tend to emphasize planning, while US companies tend to stress assessing (Fig.2-70, 2-71).

Fig.2-67 Introducing ICT system (US - Japan)

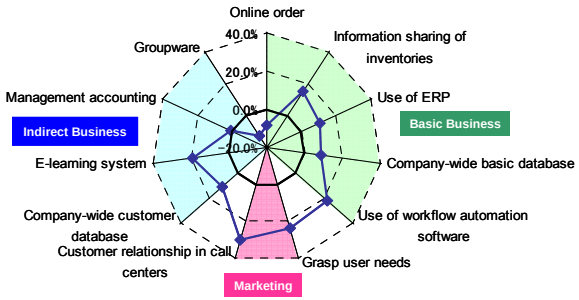


Fig.2-68 Reforming business processes / organizational structure (US – Japan)

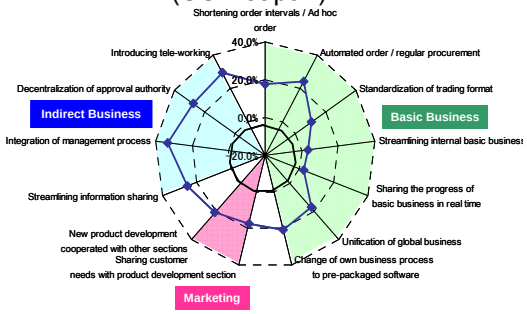


Fig.2-69 Effects of introducing ICT system and reforming business processes / organizational structure (US – Japan)

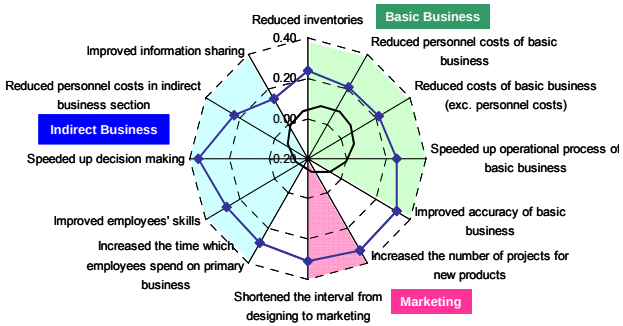


Fig.2-70 ICT management

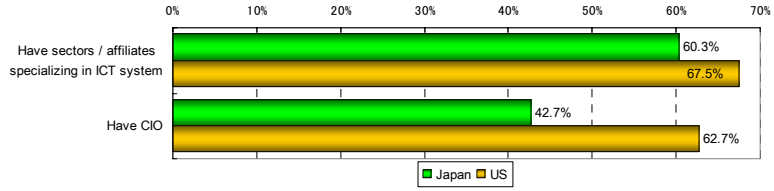
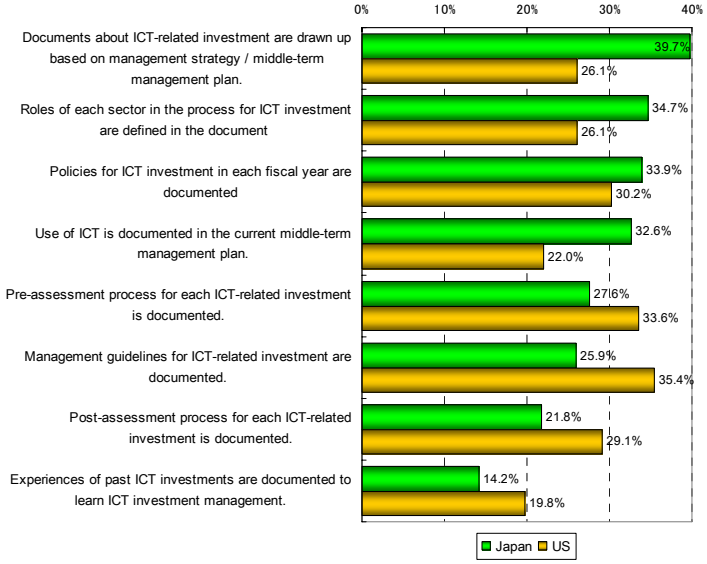


Fig.2-71 ICT investment management process



2-2 Improvement of corporate competitiveness by ICT use
(2) ICT Use and Productivity Improvement

➢As a whole, the more actively companies use ICT, the higher the productivity they tend to achieve.

➢Companies which build up intra/inter-company telecommunications network, and companies which introduce ubiquitous-related tools achieve higher productivity (Fig.2-72).

➢Companies in which employees have access to the company network from outside, and companies which furnish a network connection terminal per employee achieve higher productivity (Fig.2-73).

➢Companies which give employees an ICT-related education, and companies which place full-time CIO or CIO whose task is mostly ICT-related achieve higher productivity (Fig.2-74).

Fig.2-72 ICT use and productivity

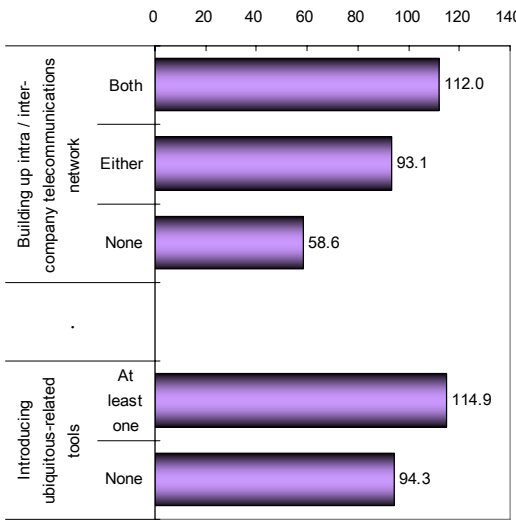


Fig.2-73 ICT use environment and productivity

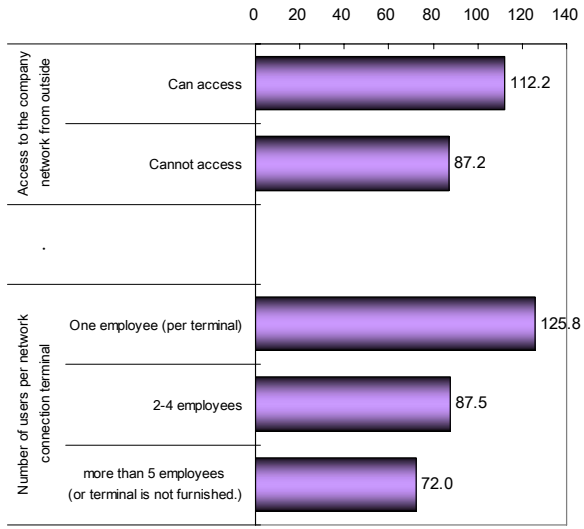


Fig.2-74 Organizational efforts and productivity

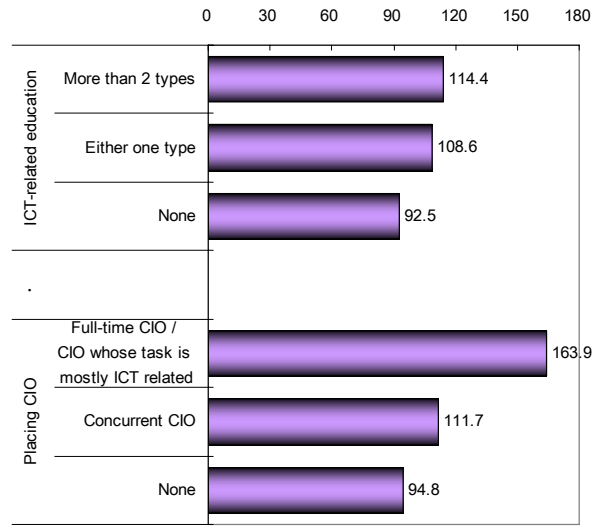


Fig. 2-72 ~ 2-74 Source: Communication Usage Trend Survey 2006 (MIC)

2-2 Improvement of corporate competitiveness by ICT use
(3) Systematization of Space Code for Productivity Improvement

➢Common base system is important for productivity improvement, but in Japan, it has been implemented differently in each industry so far.

➢Company code, product code and space code should be arranged which a variety of parties can commonly use them with consistency with global standards (Fig.2-75).

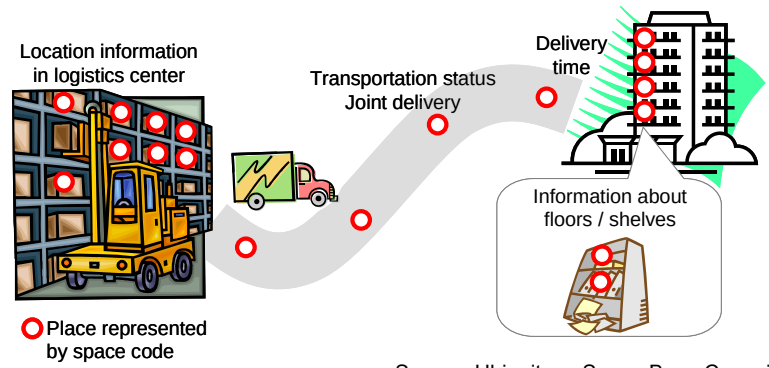
➢The arrangement of space code lag behind, while it is expected to rapidly improve trade efficiency and convenience (Fig.2-76).

Fig.2-75 Current status of each code

Subject	Major code system	Issues	Prospects
Company	• JAN code (public, logistics) 0.11million companies • VAN providers' customer code (Within the industry only) • Teikoku Databank code (private confidential inquiry) 1.75 million companies • Tokyo Shoko Research code (private confidential inquiry) 1.81 million companies • D-U-N-S Number (private confidential inquiry) 100 million companies worldwide ※Hard to get the domestic situation because Tokyo Shoko Research code is the base.	• Not all Japanese companies (4.43 million) are assigned codes. • JAN code is only for logistics and consumer goods. • VAN customer code is valid within the VAN. ↓ **There is no open code to specify every company.** Needs large investment covering not only assigning codes but also updating company information	• **Base system to assign codes to every companies and update company information is necessary** in order to make online process from order to payment by ICT possible
Products/ Materials	• GTIN (Global Trade Item Number) (in transition from JAN) • EPC (Electronic Product Code) GTIN + serial number; "Absolute single item number" • GRAI (Global Returnable Asset Identifier) Management number (Coming and going containers)	• GTIN will be assigned to every products but **it has not been assigned to all products so far**. – Products other than consumer goods (parts / intermediate products) – Half-finished products – A part of apparel products – Service products – Art • Needs to consider the balance between cost-bearing side and merit enjoying side. • GRAI will be promoted from now on.	• "GS1" (Global standard promotion group) considers code-system and attributes to manage in the fields where GTIN has not been prevalent yet. (e.g. transport / logistics, medical care, national defense) • In Japan, GS1Japan promotes standardization of code system mainly in the field of logistics / consumer goods. In other fields, the standardization depends on voluntary efforts by each industry. • **Needs to speed up the standardization in the fields other than logistics / consumer goods.**
Place	•Latitude / Longitude / Altitude •GLN (Global Location Number) •Zip code •City / Ward / Street Code	• Latitude / Longitude / Altitude make it possible to represent physical "place" exhaustively. • **There is no code system which manages "meaningful space" uniformly** (e.g. location of warehouses, desk, room, building)	• **Needs to build up the code system to manage information about "meaningful space (functional space)"** which is important in the business scene.

Source: MIC

Fig.2-76 Examples of space code use



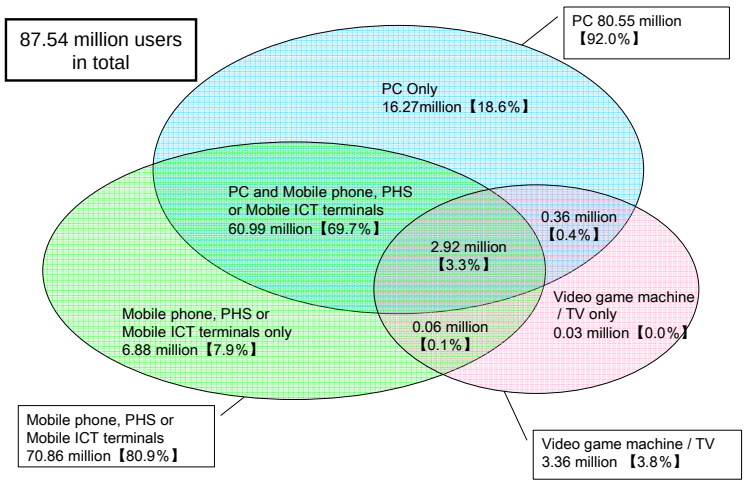
Source: Ubiquitous Space Base Council

3 ICT and Life and Society
(1) Deepening of Ubiquitous Network Society

➢Internet users in Japan are estimated at 87.54 million, as of the end of 2006. Internet users with PC represent an increased use of FTTH and video delivery services, while those with only a mobile terminal stand at 6.88 million (a decrease by 64.2% from the previous year) (Fig.3-1, 3-2).

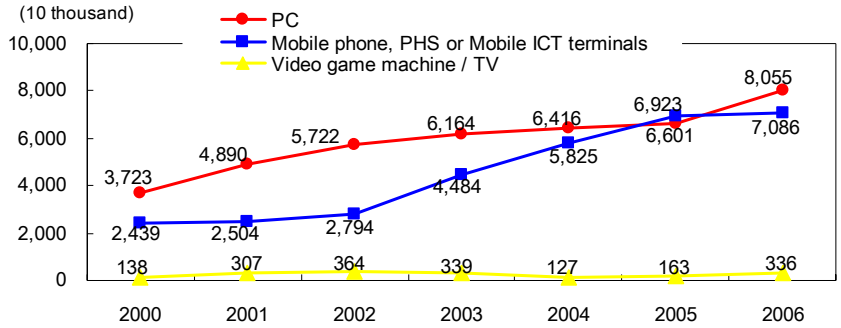
➢Mobile ICT terminals tend to be connected with network and carry a wide variety of functions such as music play, video phone, payment, and receiving one segment broadcasting (Fig.3-3).

Fig.3-1 ICT terminals for Internet use



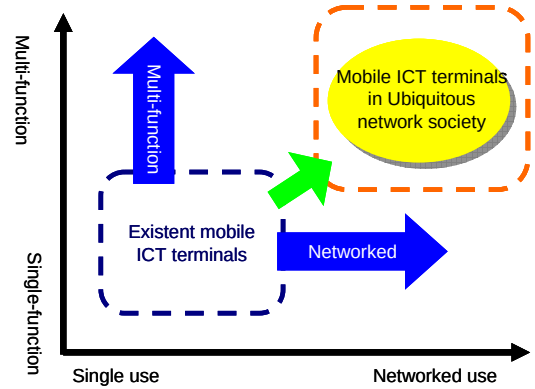
Source: Communication Usage Trend Survey 2006 (MIC)

Fig.3-2 Number of Internet users in each ICT terminal



Source: Communication Usage Trend Survey (MIC)

Fig.3-3 Progress of mobile ICT terminals in ubiquitous network society



3 ICT and Life and Society
(2) Flat Information Flow -1

➢Various kinds of collaboration and collective intelligence on the network are realized. They make use of the features of Web 2.0, such as user participation, and open-oriented.

➢CGM (Consumer Generated Media) such as blogs and SNS become popular in line with the development of the ubiquitous network society (Fig.3-4, 3-5).

➢The prevalence of CGM is changing information flow from a one-way system in which individuals receive information mostly from the existent media to a flat system in which not only media but also individuals send information to the general public through the network (Fig.3-6).

➢The increase of information from individuals and collective intelligence have a large impact on society and economy and bring an opportunity to build up a new socioeconomic system.

Fig.3-4 Changes of frequencies of reading blogs among blog readers

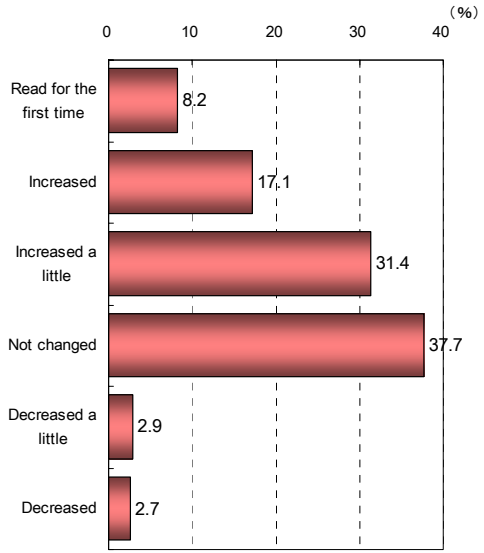


Fig.3-5 SNS use experience among SNS users

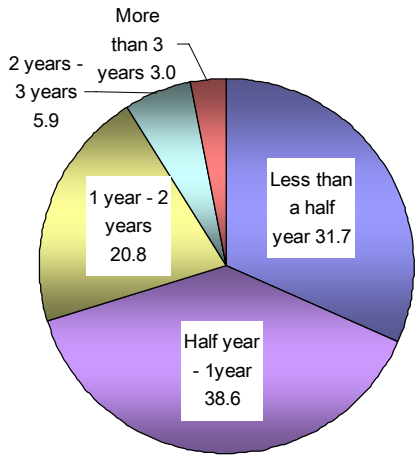
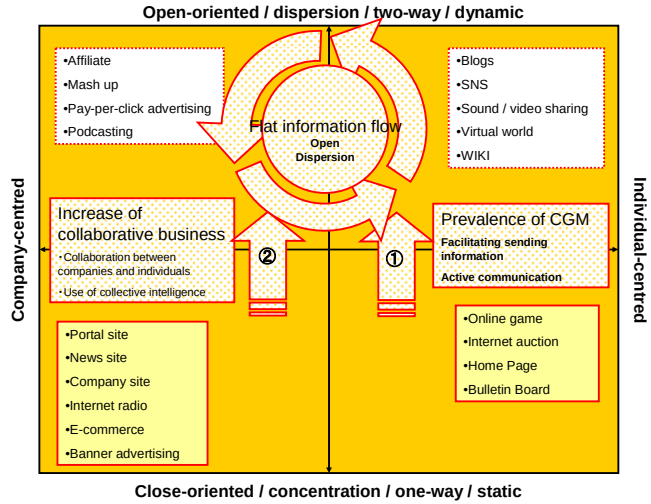


Fig.3-6 Web services and flat information flow



3 ICT and Life and Society
(2) Flat Information Flow -2

➢The information from individuals is increasing, while the existent media is being reorganized. The cooperation and M&A among the existent media and Internet companies are expanding globally (Fig.3-7).

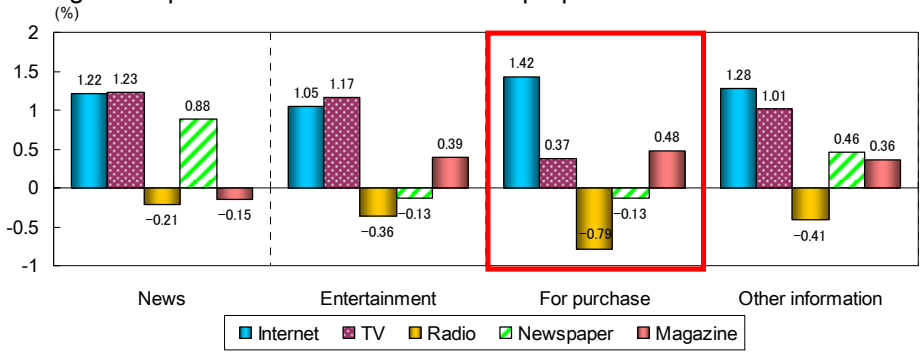
➢The Internet is becoming a major new advertising media. The amount of internet advertising has rapidly increased since 2000 (Fig.3-8, 3-9).

➢The new advertising in which the existent media and Internet collaborate will increase as a direct connection between suppliers and consumers.

Fig.3-7 Major global trends in the reorganization of media industry

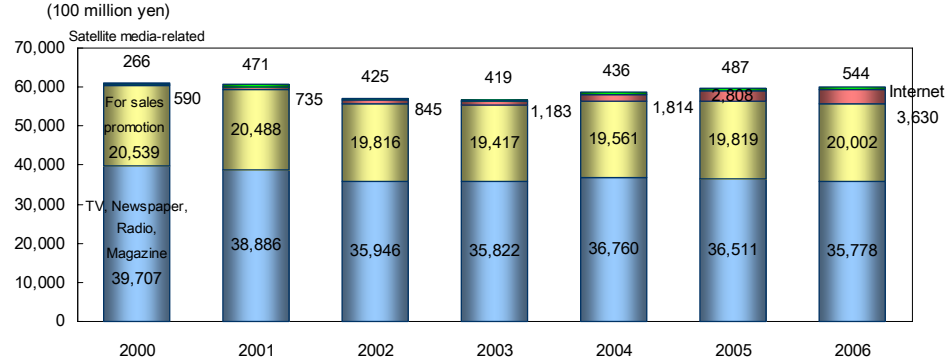
2005/07	News Corporation acquired Intermix media which operates “My Space.”
2006/01	Google acquired dMarc Broadcasting.
2006/03	Knight Ridder was sold.
2006/06	Guba tied up with Warner Bros.
2006/07	Guba tied up with Sony Pictures.
2006/10	Google acquired YouTube.
2007/02	BBC tied up with YouTube.
2007/03	NBC Universal and News Corporation started new video sharing site. They tied up with AOL, Microsoft and Yahoo.
2007/03	Viacom sued Google and YouTube.
2007/04	Google acquired Double Click.
2007/05	Tribune announced selling the company.

Fig.3-8 Importance of media in terms of purposes



Source: Impress R&D

Fig.3-9 Advertising expenditures in terms of media



Source: Dentsu Inc.

3 ICT and Life and Society
(3) Change in Lifestyle

➢More than 30% of individuals perceive changes in their purchasing, hobby/entertainment, sleeping, and eating habits these past few years. In this, over half of individuals have changed their purchasing and hobby/entertainment habits as a result of the influence of the Internet (Fig.3-10).

➢More than half of individuals feel that their purchasing and hobby/entertainment habits have changed for the better (Fig.3-11).

➢Communication tools and styles are diverse. Individuals tend to choose the tools (fixed/mobile phone, PC) and styles (e-mail, talk) depending on to whom, when, and what they want to communicate (Fig.3-12).

Fig.3-10 Changes in daily activities over the last few years and effects of the Internet

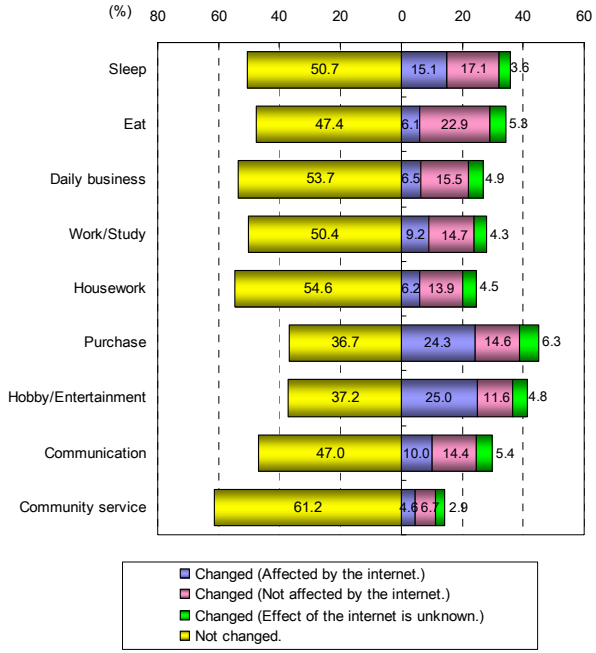


Fig.3-11 Evaluation of changes in daily activities

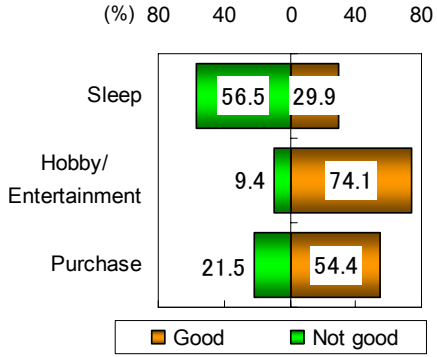
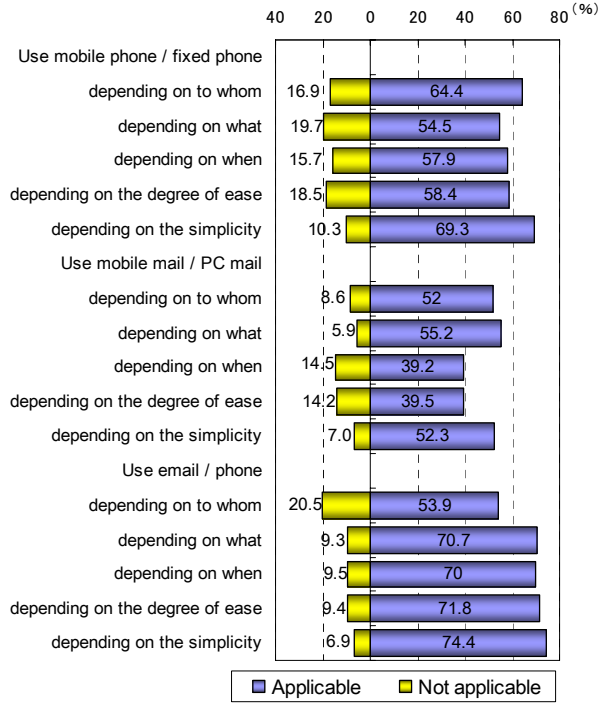


Fig.3-12 Use of communications tools / styles



3 ICT and Life and Society
(4) Digital Divide and Income

- Internet use and mobile Internet use by those 60 years and older has increased remarkably (Fig.3-13, 3-14).
- The positive correlation between internet/broadband use and income can be pointed out (Fig.3-15).
- Over half of individuals believe that economic advantages can be gained by acquiring more and better information (Fig.3-16).

Fig.3-13 Internet use by age

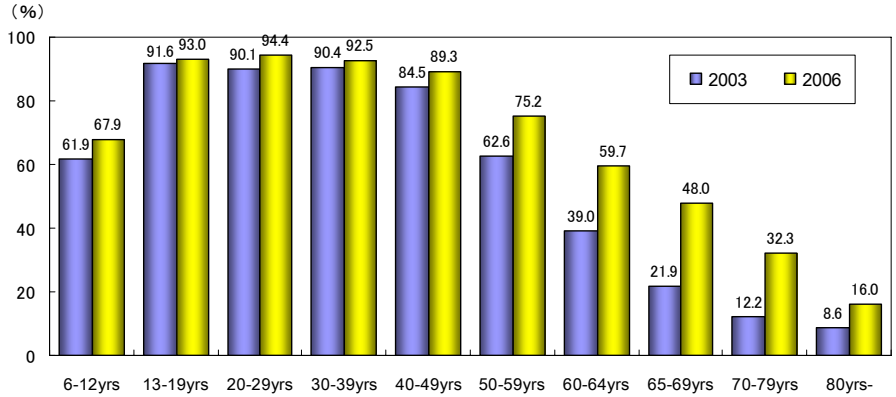


Fig.3-14 Mobile Internet use by age

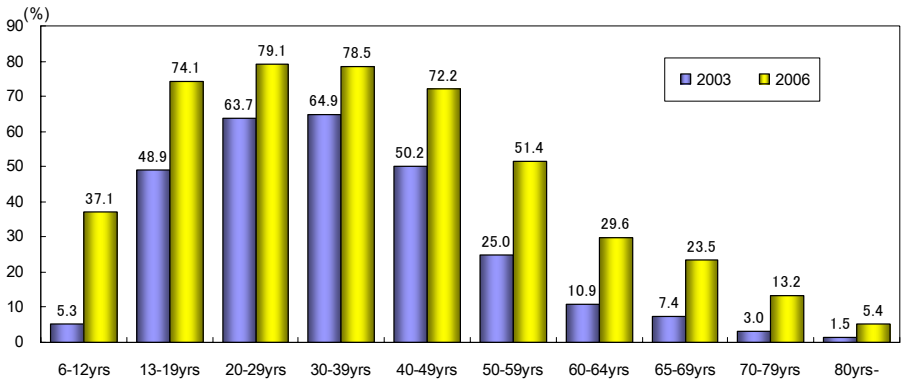


Fig.3-15 Internet / broadband use by household income

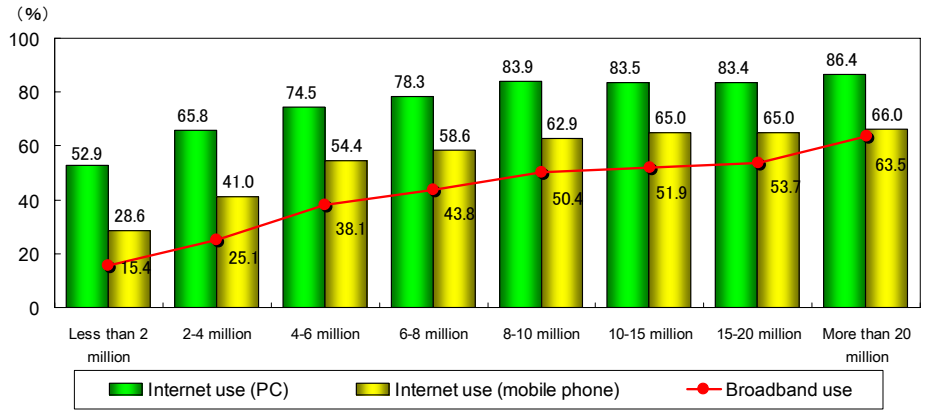
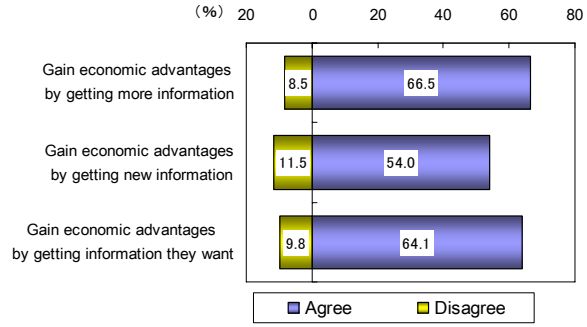


Fig.3-13 ~ 3-15 Source: Communication Usage Trend Survey 2006 (MIC)

Fig.3-16 Economic advantages of information



3 ICT and Life and Society
(5) Safe and Secure Internet Use

➢While virus infections and unauthorized access are increasing, many individuals and companies take countermeasures themselves. Only about 10% of individuals and 3% of companies take no countermeasures (Fig.3-17, 3-18).

➢All households with children under 18 years do not necessarily know filtering services. Less than 10% of households with children under 18 years use filtering services for equipment used by children (Fig.3-19, 3-20).

➢The solidity and steadiness of software are becoming increasingly important as ICT makes further inroads in daily life.

Fig.3-17 Security countermeasures by individuals

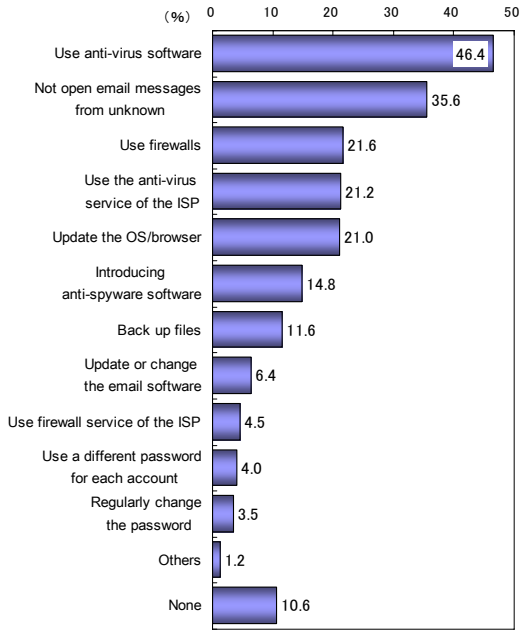


Fig.3-18 Security countermeasures by companies

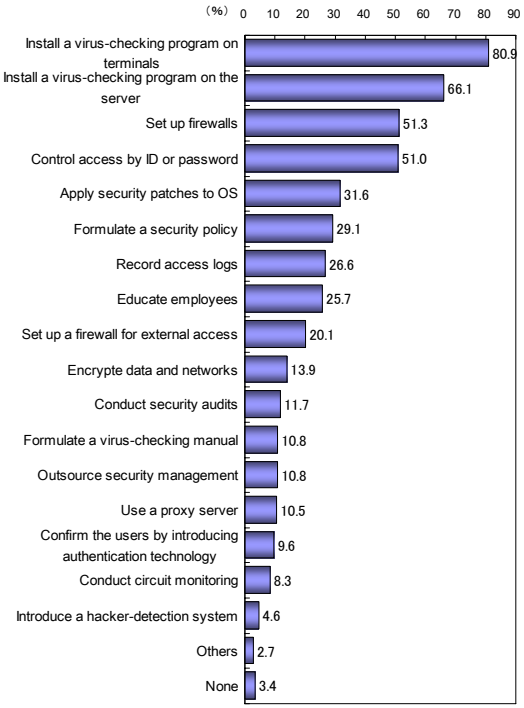


Fig.3-19 Awareness of filtering services

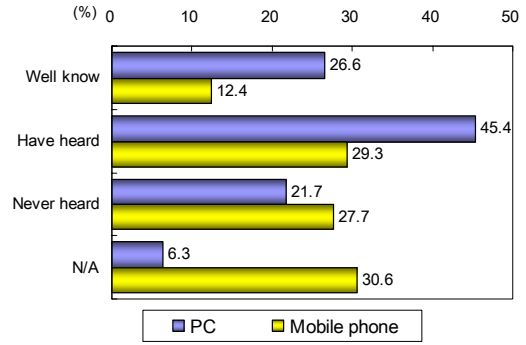


Fig.3-20 Filtering services use

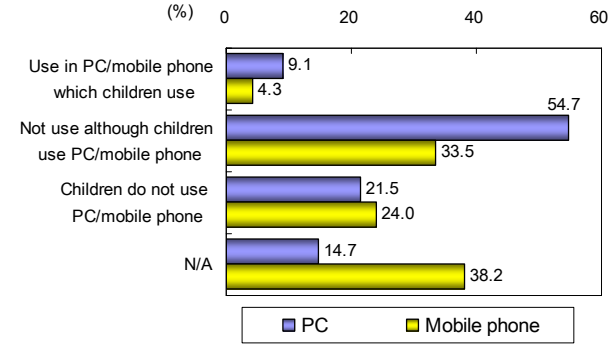


Fig.3-17 ~ 3-20 Source: Communication Usage Trend Survey 2006 (MIC)