

Is Japanese IT industry recovering at long last ?

Lessons from the 90s and prospect for 00s

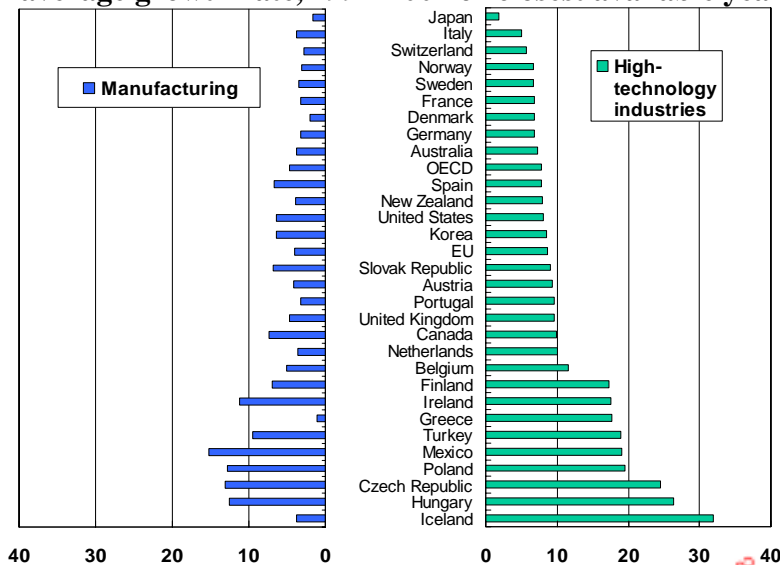
June 2004

Risaburo NEZU

Fujitsu Research Institute

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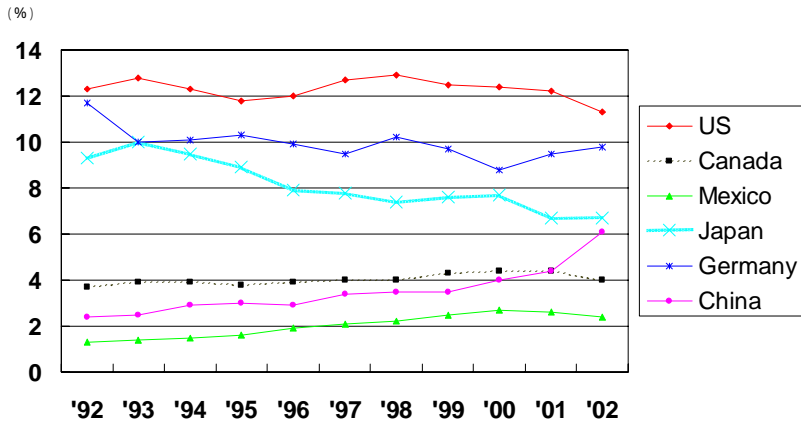
Growth of high- and medium-high-technology exports, annual average growth rate, 1992-2001 or closest available years



*OECD total excludes Czech Republic, Luxembourg, Korea and Slovak Republic. Czech 93-, Slovak 97-, Korea 94-
Source: OECD, STAN database, May 2003.

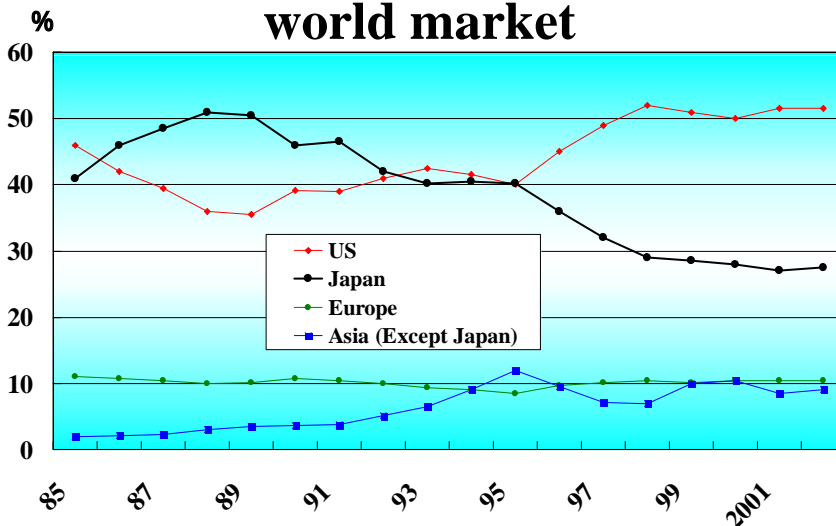
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Japanese position in international trade



Source: US Department of Commerce

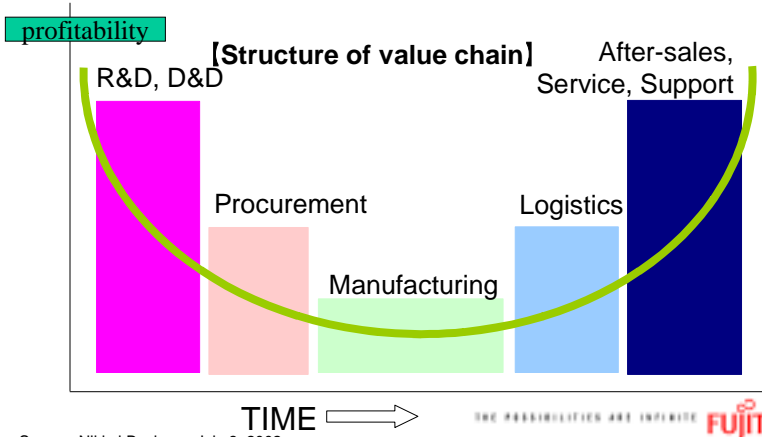
Share of semiconductor in the world market



Gartner/Data Quest

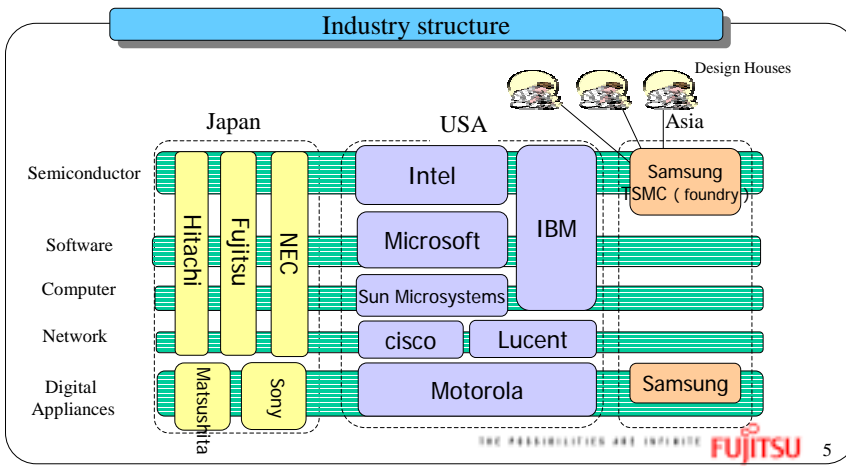
Value-chain of IT equipments

- Integrated approach VS Modular approach
- US Fabless (silicon valley) and Foundry (Taiwan)
- Japan does everything at home.

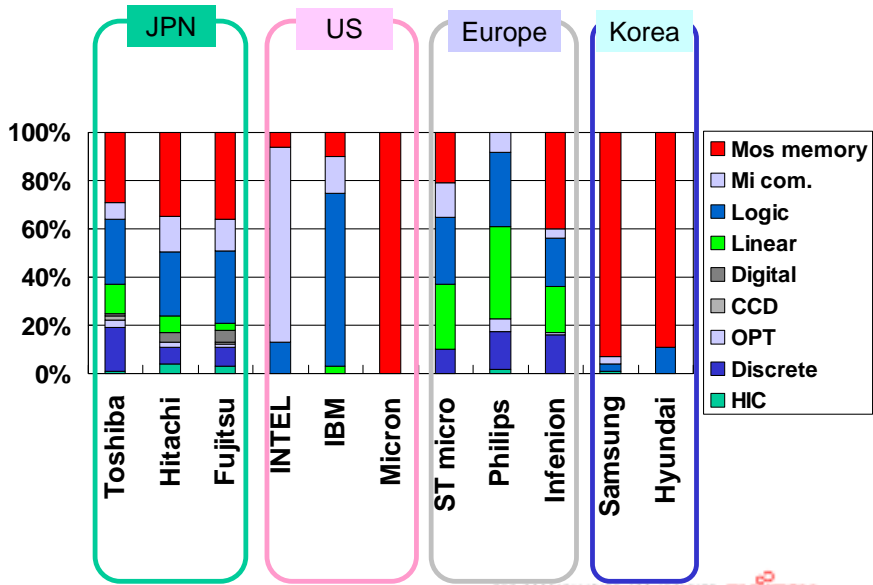


Comparison of Industry Structure (METI)

- US and Asia realized high profitability by focusing on the areas of strength
- Japan marked low profit as it spread its resources to all fields
- As a result, Japan was driven into a vicious circle of low investment and poor competitiveness

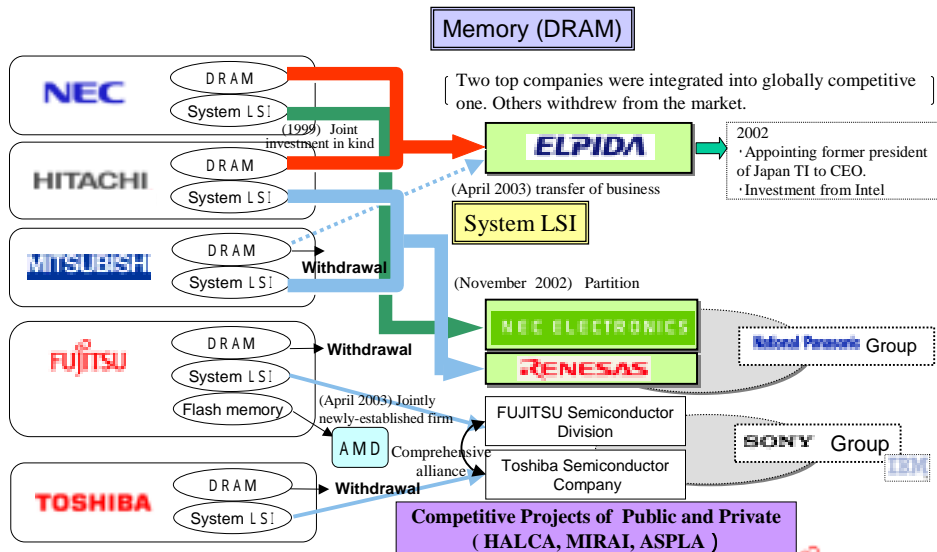


Semiconductor product mix (2000)



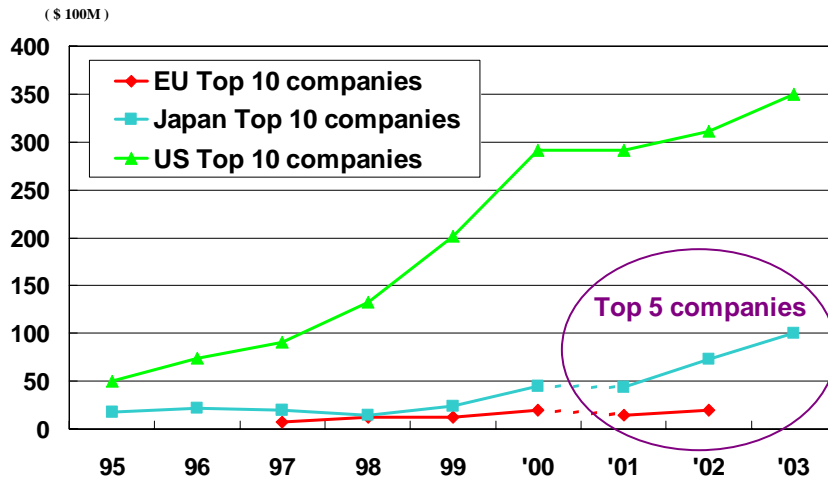
Source: Semiconductor Industry Research Institute Japan

Market reorganization in Semiconductor fields



Adapted from METI report

Procurements from Taiwan



Source: FRI research

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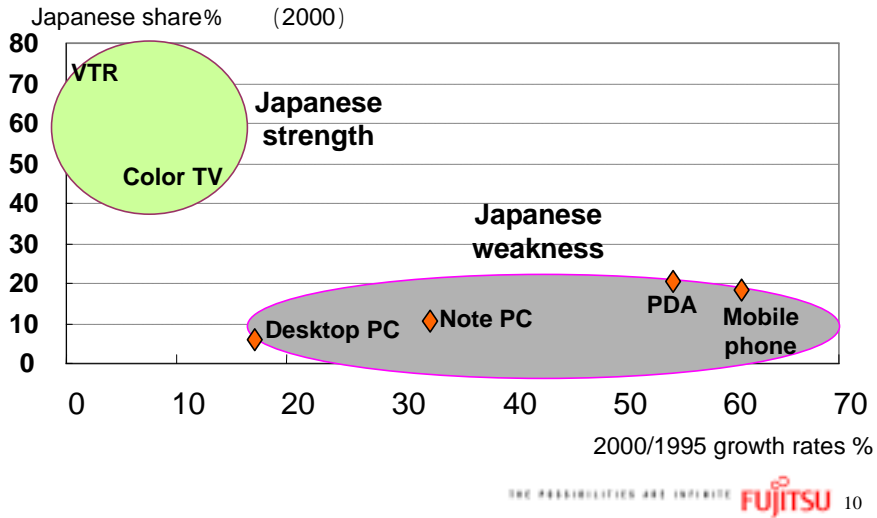
US Trade in IT products

(millions of Dollars)	2001	2002	2003
Exports of goods, balance of payments basis, excluding military	718,712	681,874	713,761
Computers, peripherals, and parts	47,555	38,553	39,928
Semiconductors	45,066	42,235	46,158
Telecommunications equipment	27,874	22,208	20,748
Other office and business machines	2,894	2,023	1,924
Imports of goods, balance of payments basis, excluding military	1,145,927	1,164,746	1,263,170
Computers, peripherals, and parts	74,001	75,150	76,522
Semiconductors	30,422	26,015	24,608
Telecommunications equipment	24,632	23,135	24,766
Other office and business machines	4,864	4,468	7,136

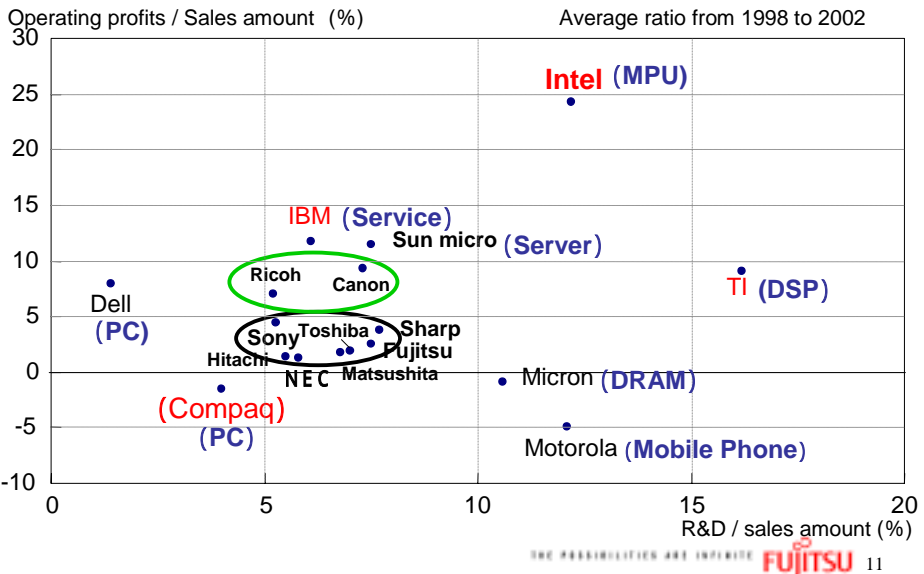
Source: US Department of Commerce

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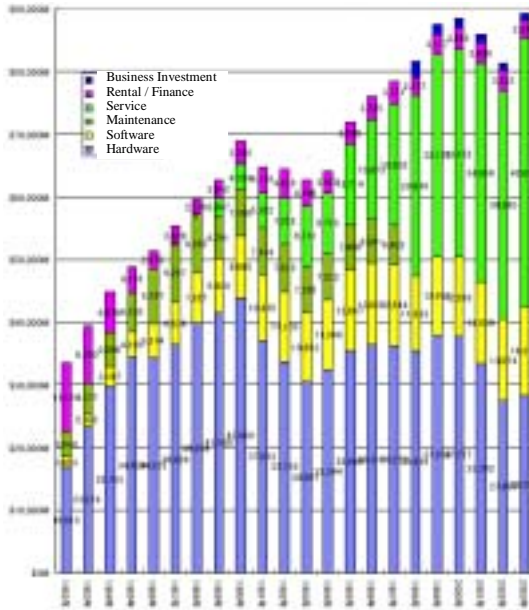
New product areas



Comparison of Japan with US Companies



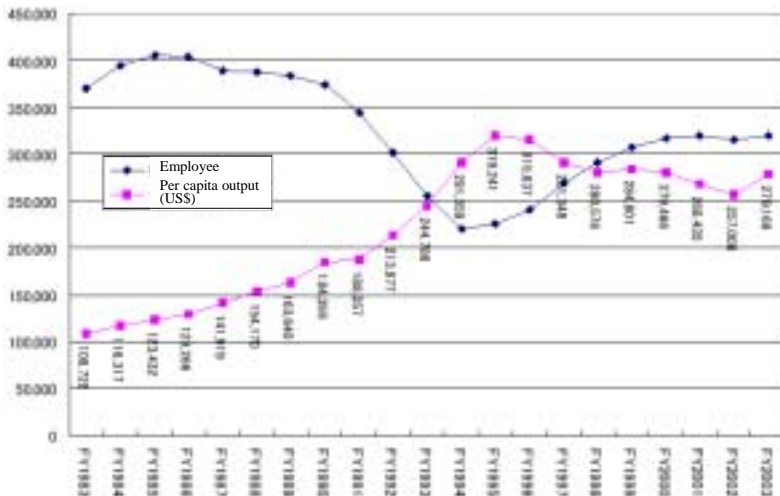
Growth of IBM's sales by segment



S&S to total sales
IBM 52%
Fujitsu 56%

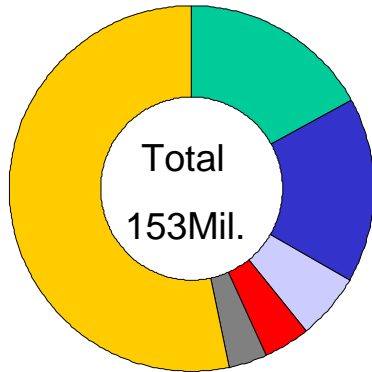
Source, Annual report FY2003, IBM

IBM per capita output



Source, Annual report FY2003, IBM

World share of PC

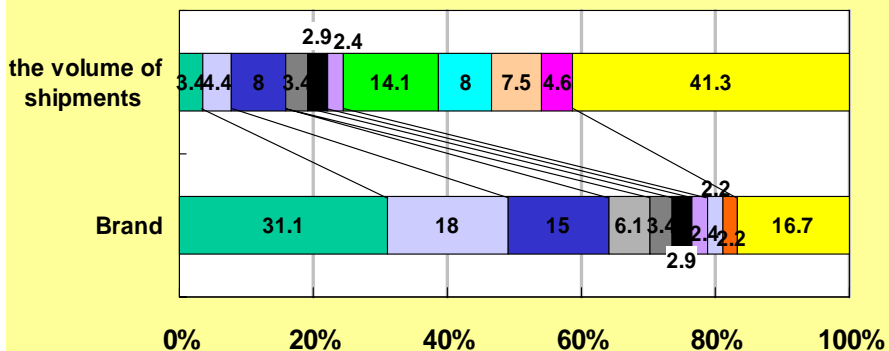
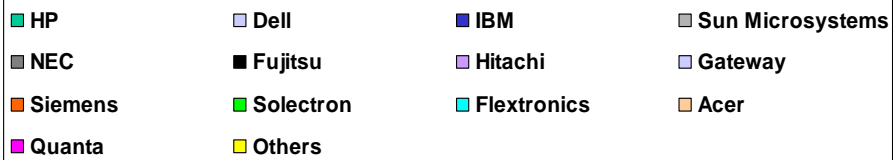


Dell (US)	*Growth rate 25.0%
HP (US)	* Growth rate 14.5%
IBM (US)	* Growth rate 12.2%
Fujitsu (JP)/ Siemens (GER)	* Growth rate 9.6%
Toshiba (JP)	* Growth rate 16.8%
Others	* Growth rate 6.6%

* Growth rate = 2002 / 2003

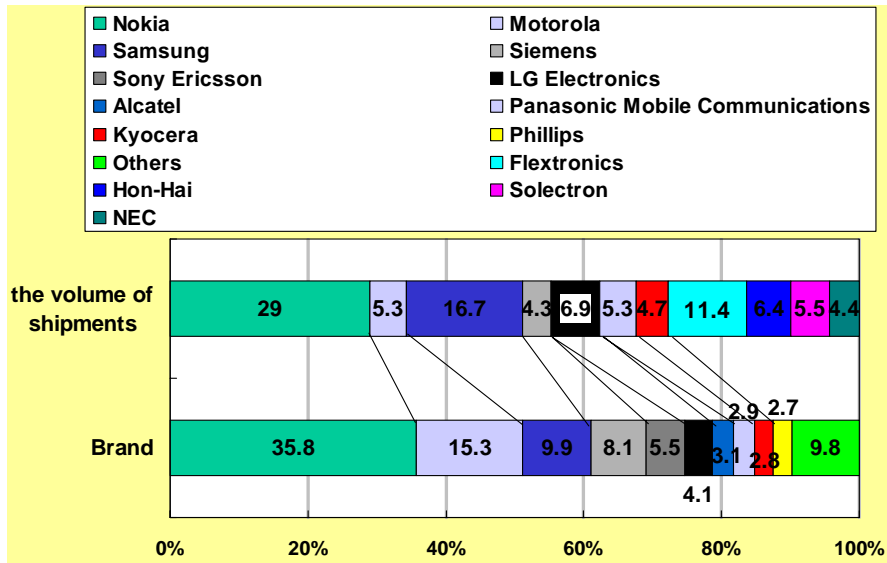
Source; IDC 2003

Shares in the global server market (2002)



Source; The Semiconductor Industry News, 26 November, 2003

Shares in the global mobile phone market (2002)



Source: The Semiconductor Industry News, 5 November, 2003

Number of patents granted by the USPO (2003)

Rank	Company	No	Rank	Company	No
1	IBM (US)	3,439	11	Samsung (Korea)	1,316
2	Canon (JPN)	1,997	12	Mitsubishi (JPN)	1,265
3	Hitachi (JPN)	1,906	13	Toshiba (JPN)	1,217
4	Matsushita (JPN)	1,821	14	NEC (JPN)	1,198
5	Hewlett-Packard (US)	1,763	15	General Electric (US)	1,139
6	Micron Technology (US)	1,708	16	AMD (US)	908
7	Intel (US)	1,595	17	Fuji Photo Film (JPN)	809
8	Philips (Holland)	1,355	18	Seiko Epson (JPN)	779
9	Sony (JPN)	1,354	19	TI (US)	771
10	Fujitsu (JPN)	1,338	20	Bosch (Germany)	758

Source: Denpa Shimbun January 14, 2004

Lessons Japan learned in 90s

1. All Japanese firms adopted same strategy, trying to do everything as others did. Resource was spread thinly over wide range of products and no Japanese company could reach a level to command control over global market.

Need to develop its own strategy, concentrate their resources and become market leader

2. They were no naïve about leakage of digital technology, allowing its Asian competitors to mimic Japanese technology.

**Need to prevent its technology from leaking to competitors.
Bringing home key operations.**

3. At the same time, they clung to integral production method at home and did not take advantage of cheap Asian resources.

Move to Asia for some part of operation and outsource

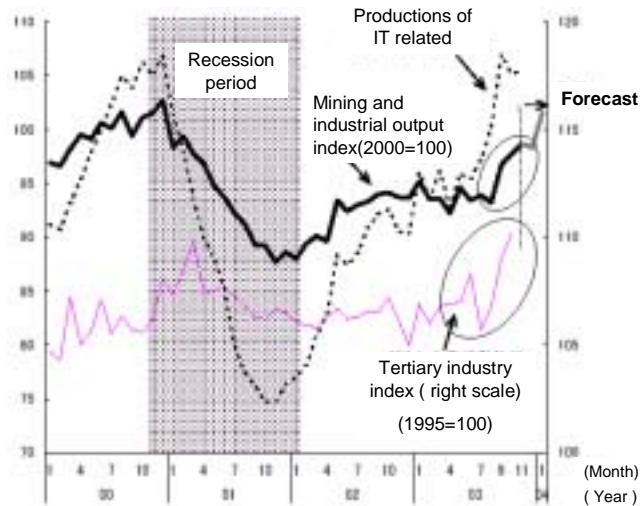
As a result, Japan was driven into a vicious circle of low investment and poor competitiveness.

Determined not to repeat the same mistake on AV equipments

But, in 2003, We began to see good signs

1. In semiconductor, consolidation in the area of DRAM and system LSI
2. Production in Asia, outsourcing and alliance with Asian companies.
3. Digital audio visual equipments are expanding
 - (a) Mobile telephone with camera, 3G,
 - (b) Digital Video Disk,
 - (c) Digital Camera,
 - (d) Flat TV (plasma TV, LCD)
4. Rapid uptake of broadband (speediest and cheapest)
5. Export to China
steel, cement, plastic,

Production is rising



Source: Indices of manufacturing, Indices of Tertiary Industry Activity, METI

Production of key IT products and components Jan-March 2004

	weight(2000)	change from	
		2000average	Jan-March 2003
Lithium ion battery	41.9	217	123
telecom relay station	5.5	143	51
LCD television	2.2	275	162
Digital camera	16.1	305	121
Car navigation	13.1	226	122
mobile phone	88.3	94	93
fax	8	17	52
circuit switching	24.4	54	123
digital transmission equipment	26.5	10	53
DVD video	6.8	46	100
color TV	10.6	46	118
PHS	6.7	13	37
main frame computer	9.2	111	99
mid-range computer	16.2	129	94
PC	84.1	71	101

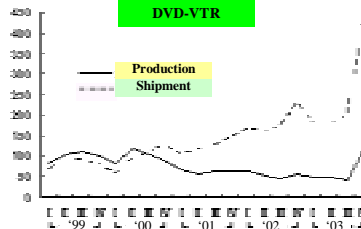
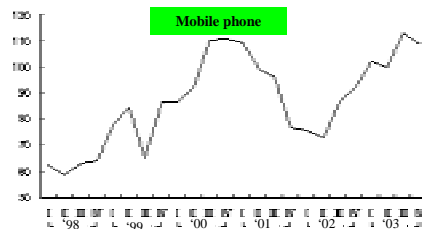
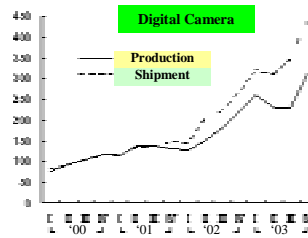
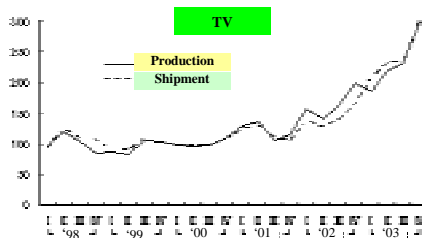
Production of Semiconductor

Jan-March 2004

	weight(2000)	change from	
		2000average	Jan-March 2003
Active LC device (large)	52.9	149	122
Active LC device (small)	28.6	371	158
Optical exchange device	42.9	110	120
Moss type device (logic)	150.1	101	121
Moss type device (logic)	116.3	198	135
mixed IC	41	96	105
Micro computer	84.7	103	108
CCD	13	776	178
Passive LC device	30.3	27	79
transistor	33.7	69	115
linear	75.1	84	108

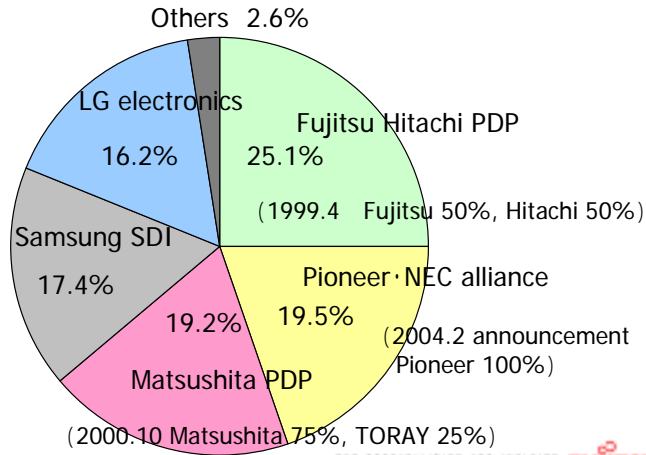
Production of LCD TV, digital camera, mobile phone, DVD

(2000=100, Seasonally Adjusted)



Share of plasma-panel TV in the World

(Perspective 2003)



Evolution of IT industry

-1995	1995-2000	2000-2003	2004-?
Mainframe/ Minicon PSTN	PC/Internet (US)	Mobile phone (Europe)	Digital home electronics, (Japan ?)
IBM, ATT, Alcatel, Siemens, NTT, Fujitsu, NEC	DELL,SUN, CISCO, HP INTEL MPU, DRAM	NOKIA, ERICSSON, MOTOROLA, SAMSUNG ST Micro, TI Flash Memory	Sharp, Sony, Matsushita CCD, CMOS
Proprietary OS	UNIX, Windows	Simbian,	TRON ,Linux ?

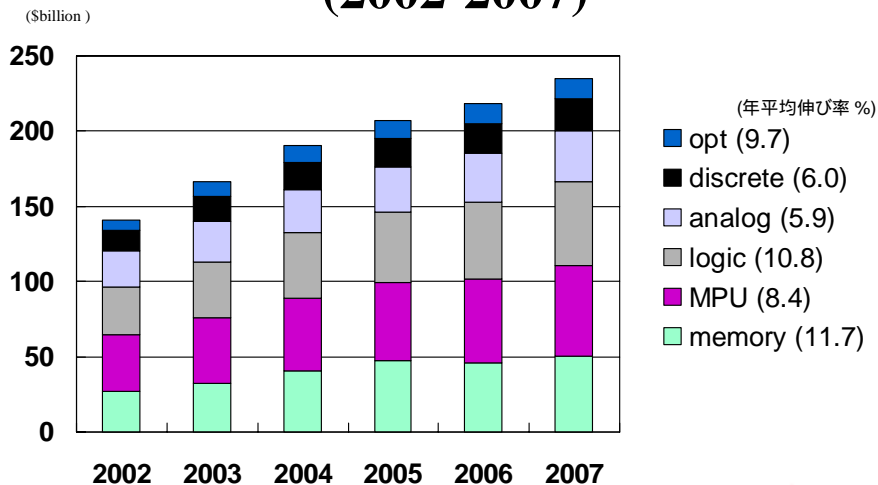
Share of semiconductor in the world Top 20 2003

Company Name	2003 Revenue (Millions of US\$)	Percent Change	Percent Total
Intel	27,036	14.1%	14.9%
Samsung Electronics	9,675	10.6%	5.3%
Renesas Technology	7,971	NM	4.4%
Texas Instruments	7,850	20.2%	4.3%
Toshiba	7,571	17.9%	4.2%
STMicroelectronics	7,238	13.9%	4.0%
Infineon Technologies	7,109	32.3%	3.9%
NEC Electronics	5,705	8.7%	3.1%
Freecale Semiconductor (Motorola)	4,629	-3.7%	2.5%
Philips Semiconductors	4,512	3.5%	2.5%
Matsushita Electric	4,016	22.4%	2.2%
Advanced Micro Devices (AMD) / Spansion	3,939	48.0%	2.2%
Sony	3,558	27.5%	2.0%
Micron Technology	3,418	18.1%	1.9%
Sharp Electronics	3,075	35.6%	1.7%
Hynix	3,071	28.4%	1.7%
Fujitsu	2,605	-16.0%	1.4%
IBM Microelectronics	2,515	-10.4%	1.4%
Qualcomm	2,466	27.0%	1.4%
Rohm	2,398	1.5%	1.3%
Others	61,368	0.5%	33.8%
Total Revenue	181,725	14.2%	100.0%

Source : iSuppli Corporation, March 2004

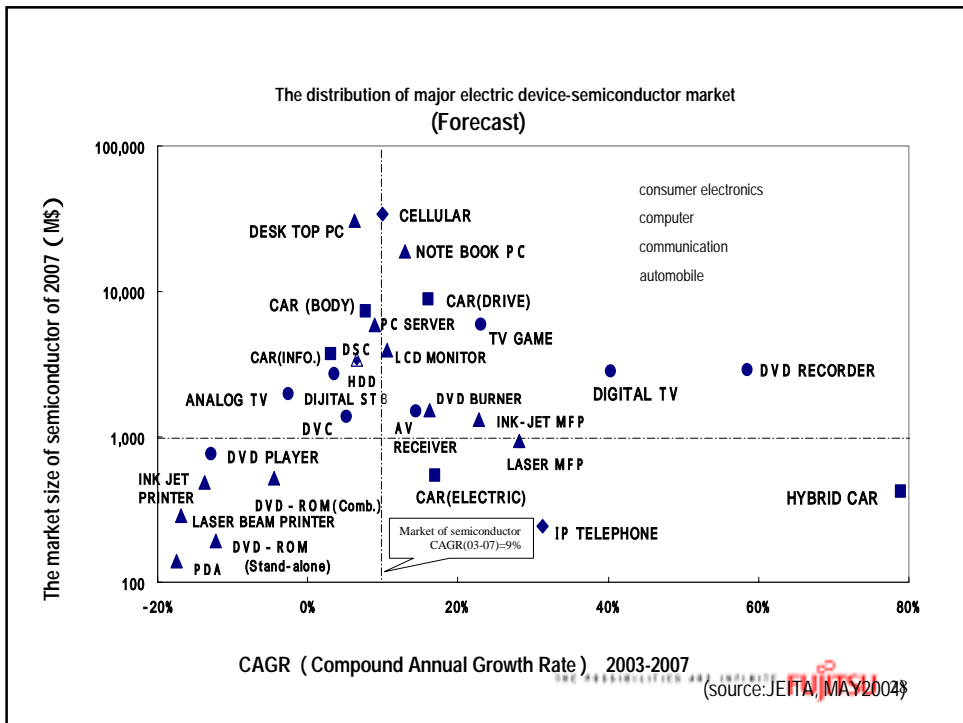
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World semiconductor market (2002-2007)



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Shortening lead time

Unit: Months

		Lead time	Interval of model change
Steel, metal	1997	80	120
	2002	80	120
Auto	1997	33	71
	2002	27% 24	17% 59
machinery	1997	28	47
	2002	10% 25	9% 42
Precision	1997	35	45
	2002	19% 29	40% 27
Electronics	1997	26	45
	2002	25% 19	43% 25

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Japanese leading Companies in 2010

Technical fields	Companies	No. of votes
LCD	Sharp	19
IC tag (RFID tag)	Hitachi	18
Photo voltaic system	Sharp	17
Hybrid car	Toyota	15
Fuel cell·Hydrogen-fueled car	Toyota	12
Amino-acid Foods	Ajinomoto	12
High capacity Optical Disk	Sony	11
CCD / CMOS	Sony	11
lithium-ion battery	Sanyo	11
Electronic money	Sony	10
Organic electro luminescence panel	Sanyo	10

Ways to build IT system

(%)

	Indirect jobs		Direct jobs		Average	
	JPN	US	JPN	US	JPN	US
Use package soft and very little customization	27.6	34.5	12.9	27.3	17.1	29.3
Use package soft, but customize much	36.3	53.5	22.0	47.5	26.1	49.2
Order made only	33.5	7.2	61.7	19.3	53.6	15.8

Present situation of investment in IT and its effects

(High Score: 10)	present situation (index)		Effect of IT investment (index)	
	Japan (average)	US (average)	Japan (average)	US (average)
All industries	6.39	7.64	3.33	5.90
IT	6.47	6.28	3.77	4.50
Manufacture (machinery)	6.94	7.86	3.12	6.21
Manufacture (non-machinery)	6.99	8.12	3.53	6.12
Construction	6.41	6.79	3.29	5.92
wholesale and retail trade	6.51	7.44	3.41	5.73
Finance and Insurance	5.75	7.97	3.63	6.15
Others	5.27	7.78	3.23	6.42


Source: WHITE PAPER Information and Communications in Japan 2003,
Ministry of Public Management, Home Affairs, Posts and Telecommunications

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Information sharing through IT network

Introduction of IT system for purpose of information sharing		(%)	
		JPN	US
Purposes (multiple answers)	Gaining new customers, enhancing customer satisfaction	58.0	80.9
	Advancing quality of jobs	13.5	47.4
	Employee satisfaction and skill improvement	26.2	41.4
	Raising efficiencies of jobs	52.3	52.1
% of firms that share information by IT across departments		51.6	61.7
% of firms that share information by IT with supplier firms, clients and business partners		75.9	94.6
% of firms that set up a special division to control the flow of information		28.5	64.3

Source: WHITE PAPER Information and Communications in Japan 2003,
Ministry of Public Management, Home Affairs, Posts and Telecommunications

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IT literacy of employees and training scheme

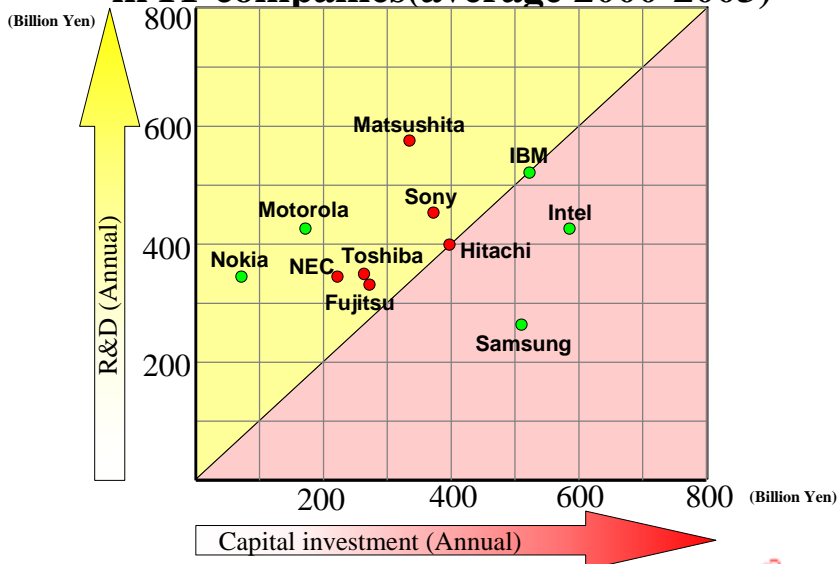
(%)

		JPN	US
% of firms with training programs		22.1	71.6
	Training is provided, literacy is high	6.8	44.3
	Training is provided, but literacy level is not adequate	15.3	27.3
% of firms with no training program		75.6	25.3
	No training but literacy is high	30.3	13.3
	No training and literacy is poor	45.3	12.0
No answer		2.3	3.0

Source: WHITE PAPER Information and Communications in Japan 2003,
Ministry of Public Management, Home Affairs, Posts and Telecommunications

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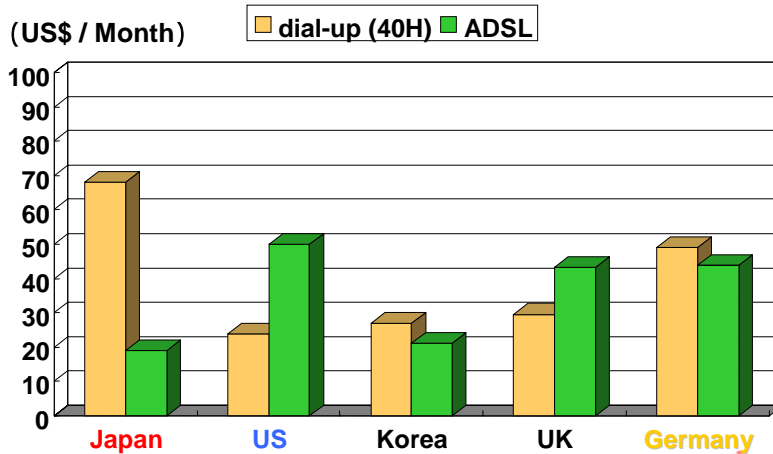
Amount of R&D and Capital investment in IT companies (average 2000-2003)



Nikkei Business 10, May 2004

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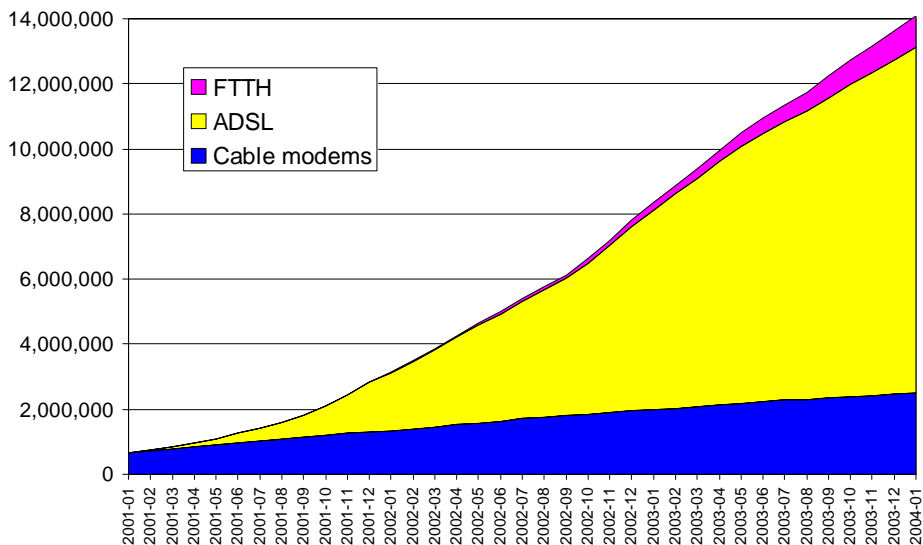
Rate of Dial-up and ADSL



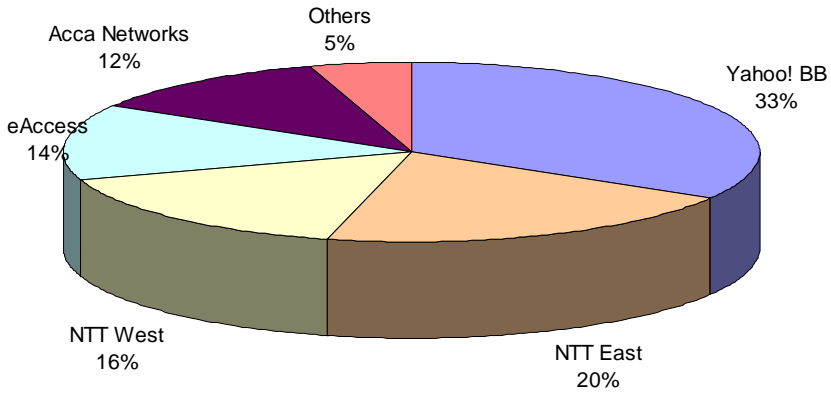
Source: FRI

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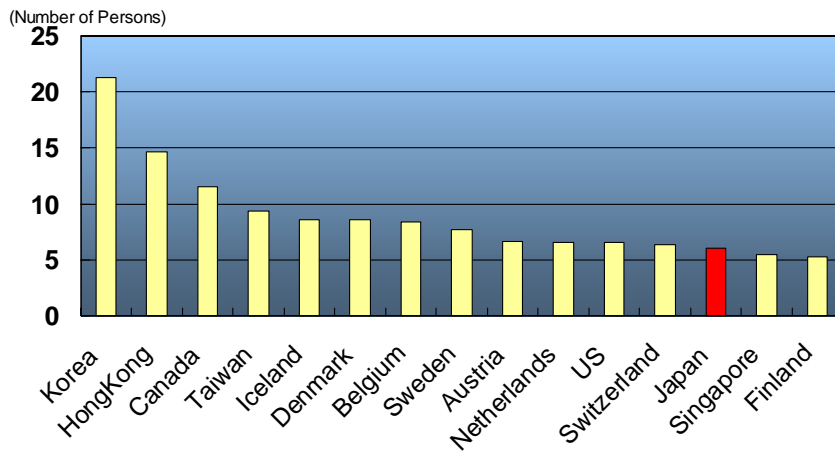
Japanese broadband



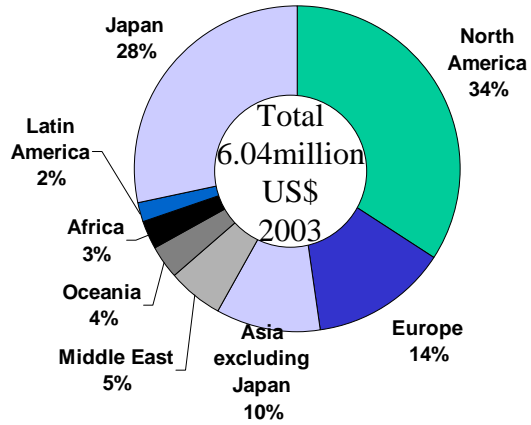
ADSL market shares in Japan



Broadband subscribers per 100 population (2002-ITU)



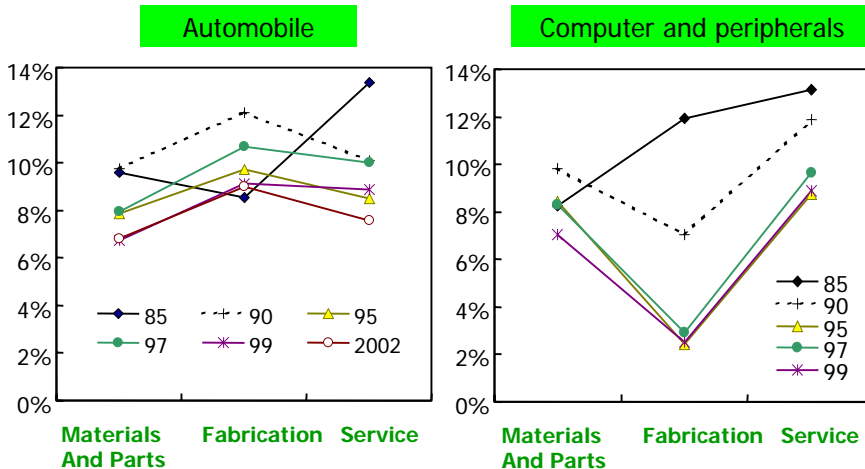
Americanization of Toyota



Source: Asahi shimbun

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Smile curves applied to automobile and computer industries



produced from input and output table by Fujitsu Research institute

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Product architecture

	integral	modular
closed	Strong areas · automobile · home electronics steel	· Main frame · Machine tools
open		Weak areas · digital electronics software · New financial products

Where Japanese strength lies in terms of number of parts

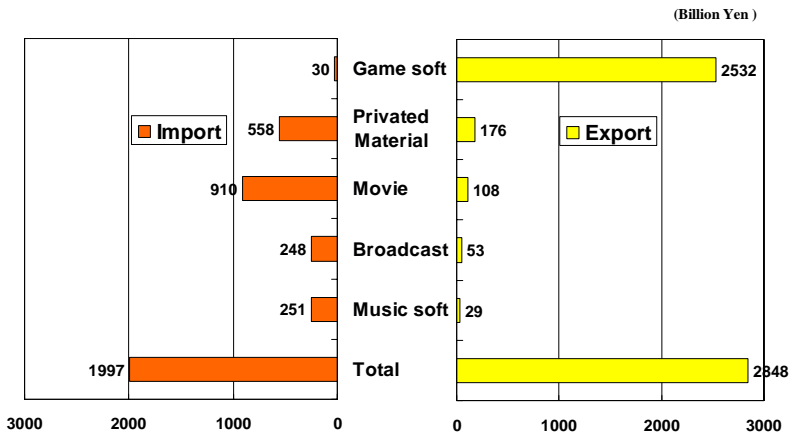
[number of parts]	1	10	100	1,000	10,000	100,000	1,000,000
[strength]						Camera, machine tools, TV, auto	
[weakness]							Air craft, space OS
	chemical catalyst biotec						

Factories producing 300mm silicon (existing and planned)

Company	Location	Investment (100million Yen)	Date of Operation
Intel	US	2,100	First half, 2002
	US	2,100	First half, 2002
	Ireland	2,100	2Q, 2002
TI	US	1,500	First half, 2002
IBM	US	3,000	Latter half , 2002
AMD	US	2,000	2004
Samsung	Korea	1,500	1Q, 2002
	Korea	2,000	2Q, 2002
TSMC	Taiwan	2,600	2Q, 2002
	Taiwan	2,300	1Q, 2002
Elpida Memory	Japan (Hiroshima)	1,600	September, 2002
Mitsubishi	Japan (Kochi)	2,000	First half, 2003
Toshiba	Japan (Oita)	2,000	July, 2004
	Japan (Yokkaichi)	2,000	Spring, 2006
NEC Electronics	Japan (Yamagata)	600	Latter half , 2004
Fujitsu	Japan (Mie)	1,600	April, 2005

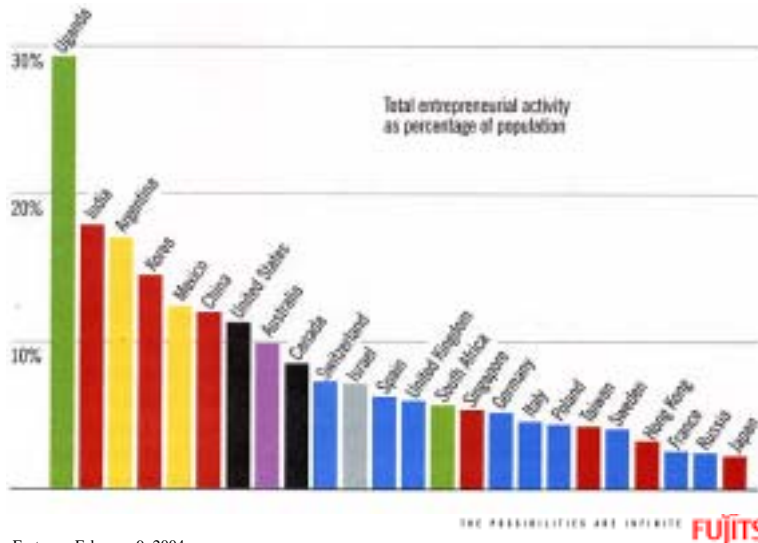
Source: Fri Research based on various company's reports

Trade in contents in Japan (2001)



Source: METI

But, entrepreneurial spirit is still weak



New approaches of Japanese IT companies

1. Move away from commoditized products (e.g. DRAM, PCs)
2. Stop “ do as other so “ attitude and concentrate resources on areas of strength of individual companies.
3. Increase speed to make timely decisions
4. Protect technologies and avoid leak to competitors. (black-boxing ? produce key components at home ?)
5. Use external resources through alliance, outsourcing, joint R&D.

Is success assured ?

still some concern remains

1. Is silicon cycle still valid ? If so, is current boom of digital AV short-lived until 2005 ?
2. In spite of call for independent business strategy, are Japanese firms not repeating “ do as others do “ mentality, thus over-investing in digital AVs ?
3. Are US firms(DELL, HP) not moving in this area ?
4. Will Koreans and Chinese sooner or later acquire Japanese technologies ?
5. More fundamentally, are Japanese suited for digital IT industry, where speed is much faster and innovation is discontinuous ? What is the difference with auto ?