MOEA

The 26th STAG Board Meeting of the Executive Yuan

Topic 1: Strengthen the Professional Labor Force to Maintain Economic Competitiveness

Discussion 2: Strengthen Utilization Strategies of Human Resources for Knowledge-based Economy

Sponsoring Agency: Ministry of Economic Affairs
Assistant Sponsors: National Science Council, Ministry of Education

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Outline

I. Background

II. Issue Analysis

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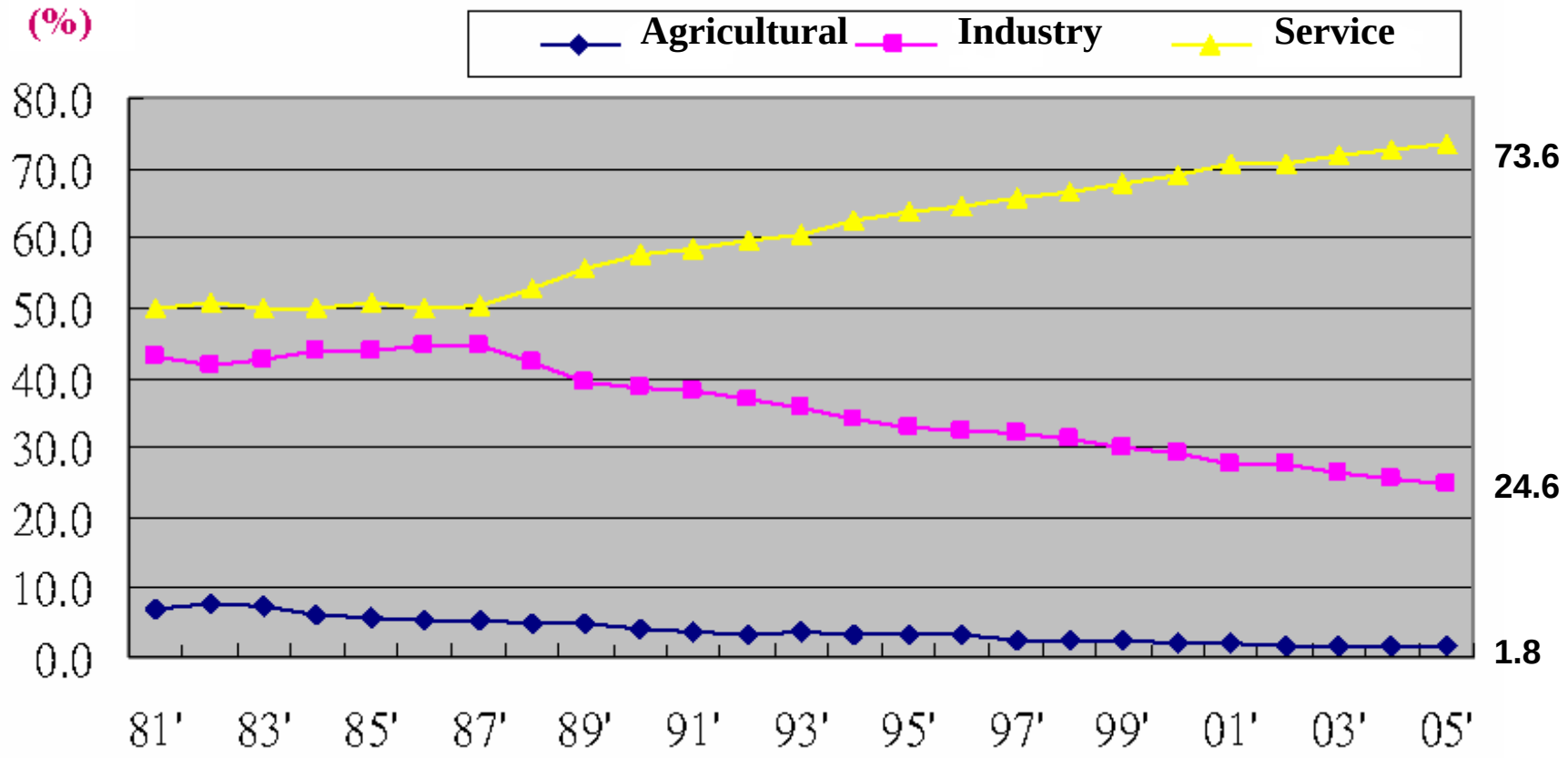
I. Background

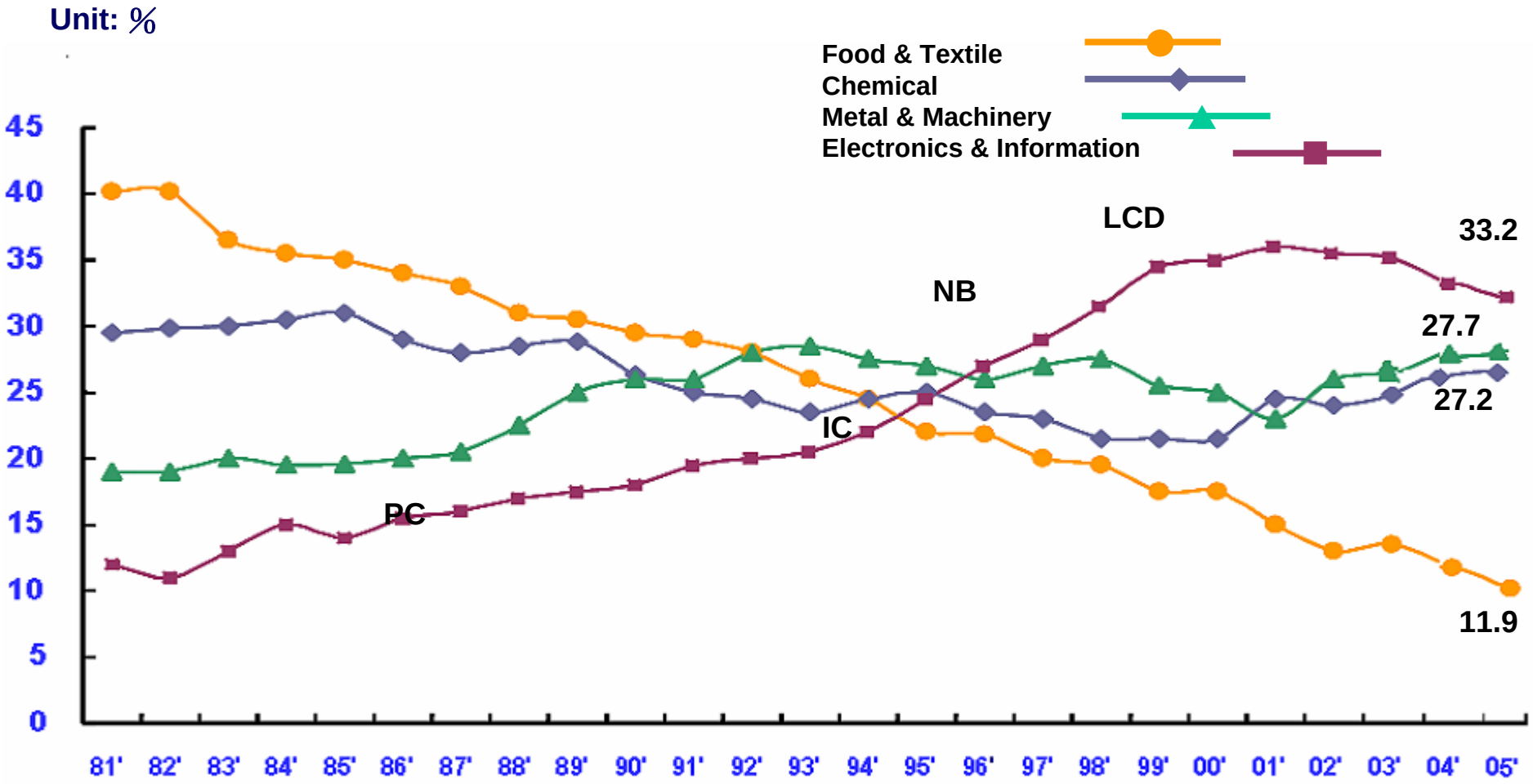
(I) Change of industrial Structure



Issues：

- **Enhance competitiveness of manufacturing industry.**
- **Explore new business opportunities in services.**

(II) Structural Change of Production Value in Manufacturing Industry



Issues：

- **Enhance the existing comparative advantages.**
- **Promoting new emerging industries.**

(III) Current Status of Manufacturing Industries

Year	2002	2003	2004	2005
Enterprises （ ten thousand ）	7.4	7.6	7.7	7.8
Employees（ ten thousand persons ）	231	235	242	244
Value of annual production（ in US$ billion）	233	254	292	331
Added value （ in US$ billion）	72.9	79.8	89.9	91.0
Export value （ in US$ billion）	130	143	173	188
Average value of annual production value per employee（in US$ ten thousand ）	10.1	10.8	12.1	13.6
Average added value per employee（in US$ ten thousand ）	3.2	3.4	3.7	3.7
R&D expenditures against added value (%)	1.68	1.82	1.93	-

Issues：

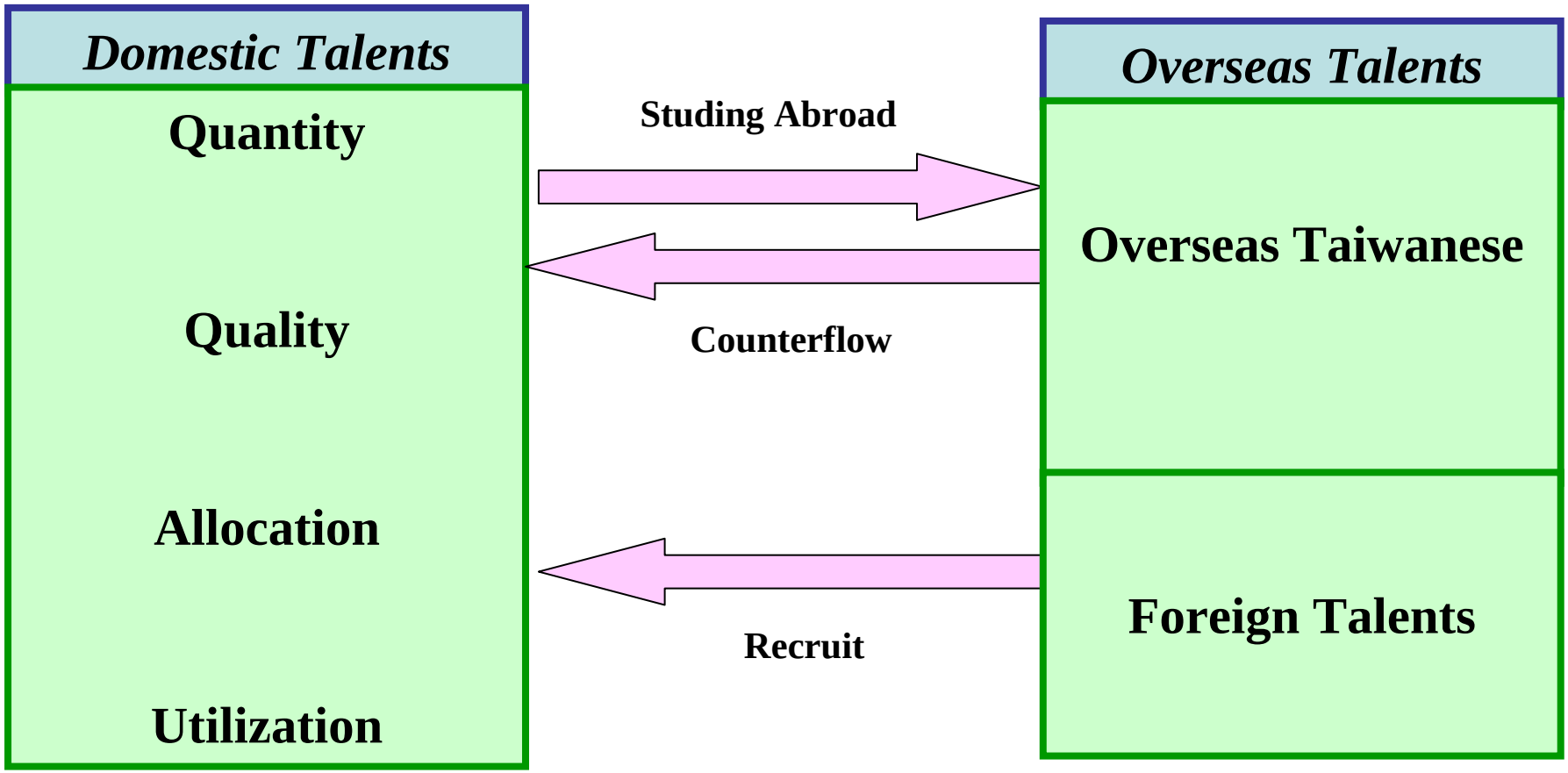
- **Low value-added ratio.**
- **Low R&D revenue ratio.**

(IV) New Paradigm Shift

- Hardware → Software
- Mass Production → Integrated Services
- Cost-down → Value-up
- OEM(ODM) → OBM

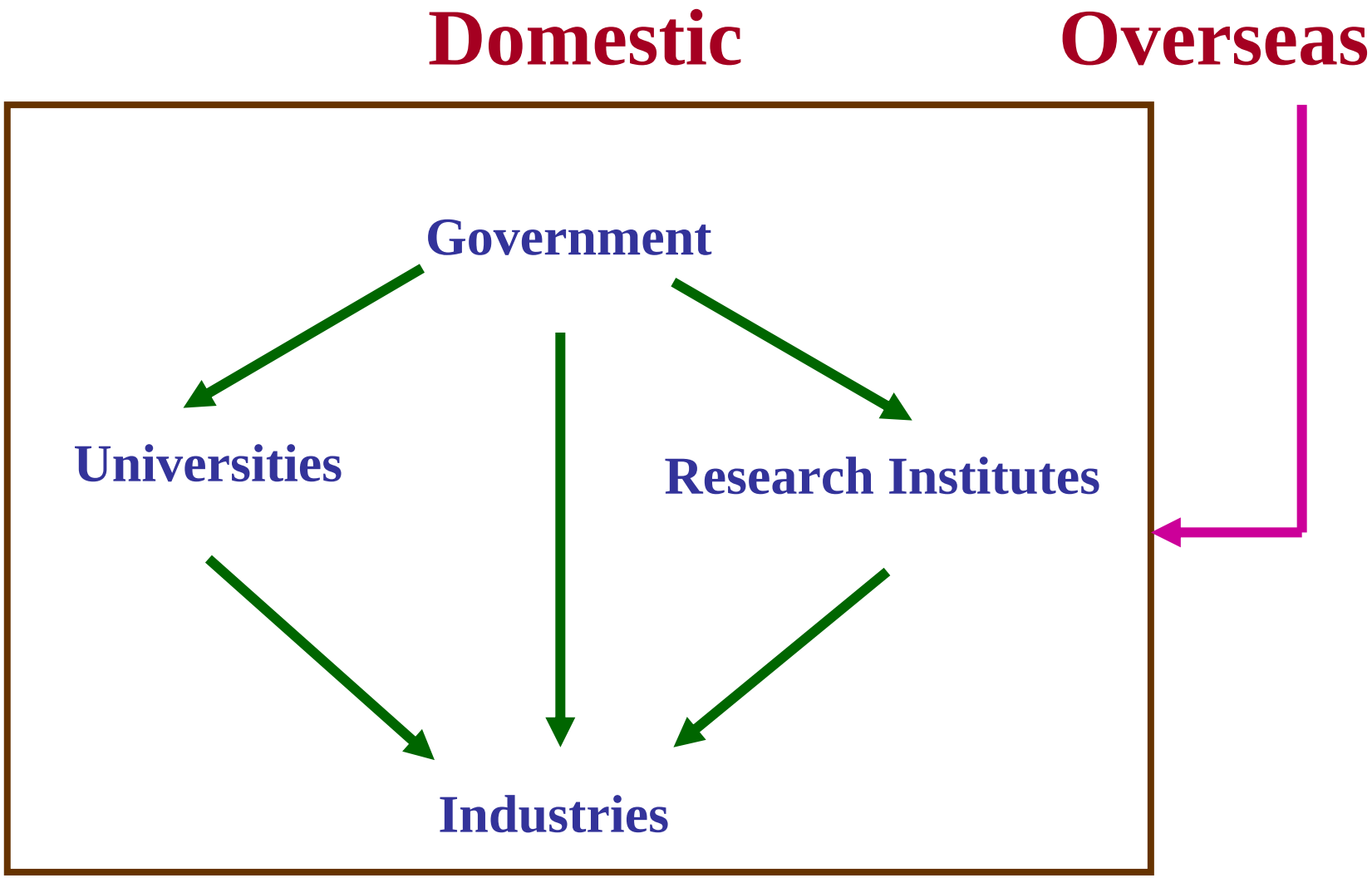
✓ **Key Success Factor : Human Resources**

(V) Strategies for Human Resources



II. Issue Analysis

(I) Analysis Framework



(II) Utilization of Domestic Talents
1.Allocation of Domestic Talents

❖In 2004, 70% of Taiwan's doctorate degree holders were employed in higher education, while about two-thirds of master's degree holders worked in private industry.

(Unit: Persons)

Executive Dept.	Doctorate	%	Master's	%	Bachelor's	%	Total Number of R&D Manpower
Business Enterprise Sector	2,772	11.90%	25,717	66.09%	22,306	76.20%	50,795
Government Sector	3,753	16.10%	9,106	23.40%	4,161	14.22%	17,020
Higher Education Sector	16,451	70.59%	3,726	9.57%	2,605	8.90%	22,781
Research Institutions Sector	330	1.42%	364	0.94%	200	0.68%	894
Total	23,306	100.00%	38,912	100.00%	29,272	100.00%	91,490

Source: Indicators of Science and Technology, 2005

2.Industrial R&D Expenditure

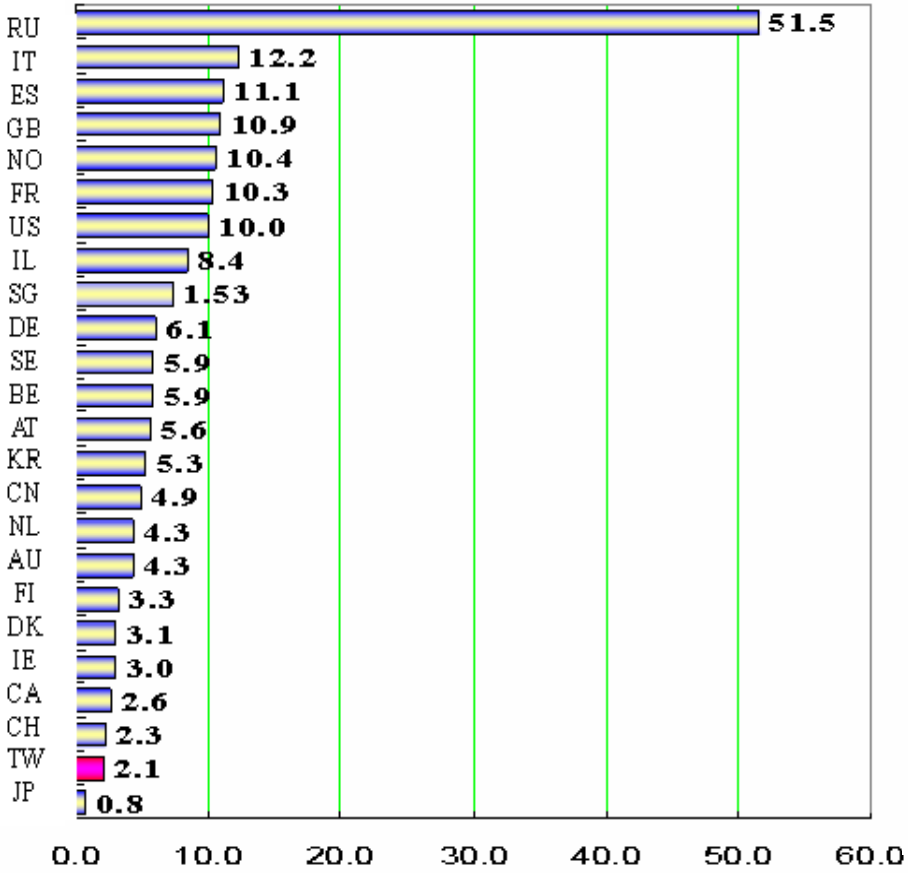
	Total （NT: Million ）	Government （％）	Enterprises （％）	
				Ratio of revenue （％）
2001	204,974	23.3	63.6	1.24
2002	224,428	24.8	62.2	1.27
2003	240,820	24.9	62.5	1.24
2004	260,851	23.4	64.4	1.23

Source: Indicators of Science and Technology Taiwan, 2005

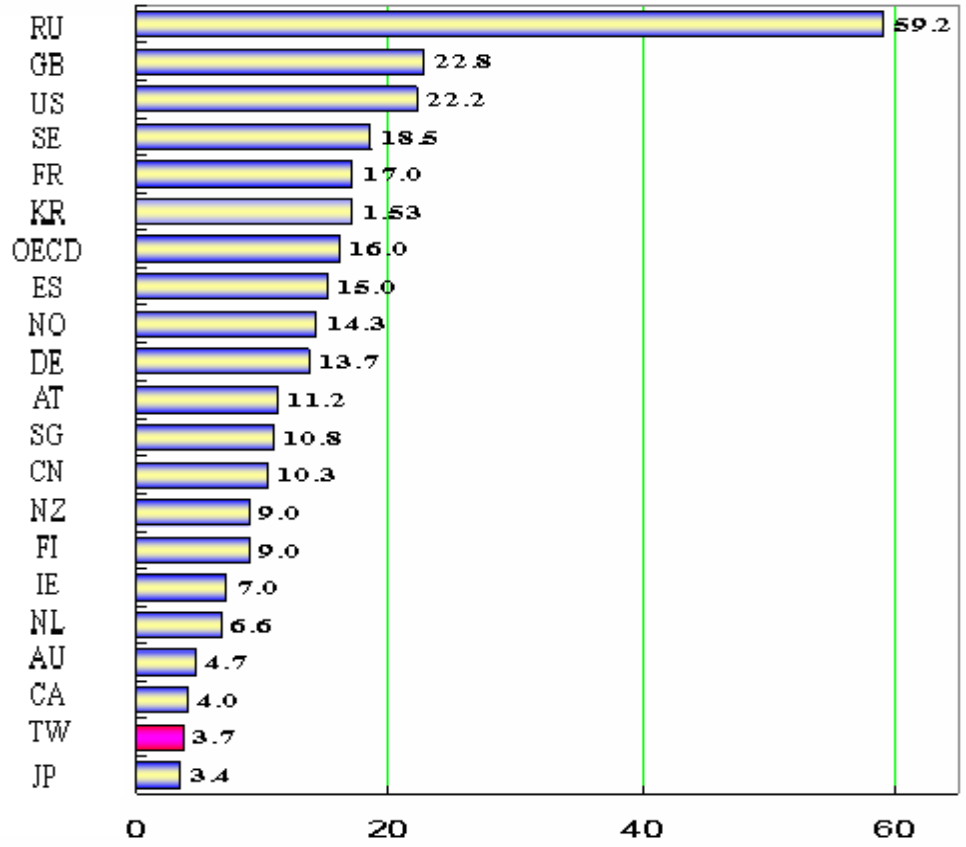
3. Government Subsidies Make up Only a Small Percent of Industry's Total R&D Budget.

- Government funds made up only 2.1% of industry's R&D budget in 2003.
- Government R&D subsidies to industry made up only 3.7% of the government's total R&D budget in 2003.

Percent of Industry's R&D Budget Subsidized by the Government in 2003 by Country



Percent of Government's Total R&D Budget Used to Subsidize Industry Research in 2003 by Country



Source: Taiwan Institute of Economic Research's Taiwan's Industrial Technology Innovation Competitiveness and Collaborative Research Plan (2005). Plan commissioned by Ministry of Economic Affairs, Department of Industrial Technology.

4. Current status of Industry-University Cooperation

- In 2004, industry provided universities with only 5.2% of their total R&D budget.

Percent of University R&D Budgets Provided by Industry for Key Nations

Nation	2001	2002	2003
Japan	2.3	2.6	2.7
USA	5.5	4.9	4.5
UK	6.2	5.8	5.6
Finland	6.7	6.2	5.8
Netherlands	7	7.1	6.7
Canada	8.7	8.7	8.7
Germany	12.2	11.8	12.1
South Korea	14.3	13.9	13.6
OECD	6.1	5.8	5.7
Taiwan	3.2	3.3	4.2

Source: Taiwan Institute of Economic Research, 2005

Higher Education R&D Budget Source Comparison

Year		2002	2003	2004
Total (in millions)		27,637	28,890	30,350
R&D Budget Source	Business Sector	3.3%	4.2%	5.2%
	Public Sector	85.5%	85.1%	83.4%
	Higher Education Sector	9.9%	9.5%	10.1%
	Private Non-Profit Sector	1.3%	1.0%	1.3%
	Sources Abroad	0.1%	0.2%	0.1%

Source: National Science Council, 2005

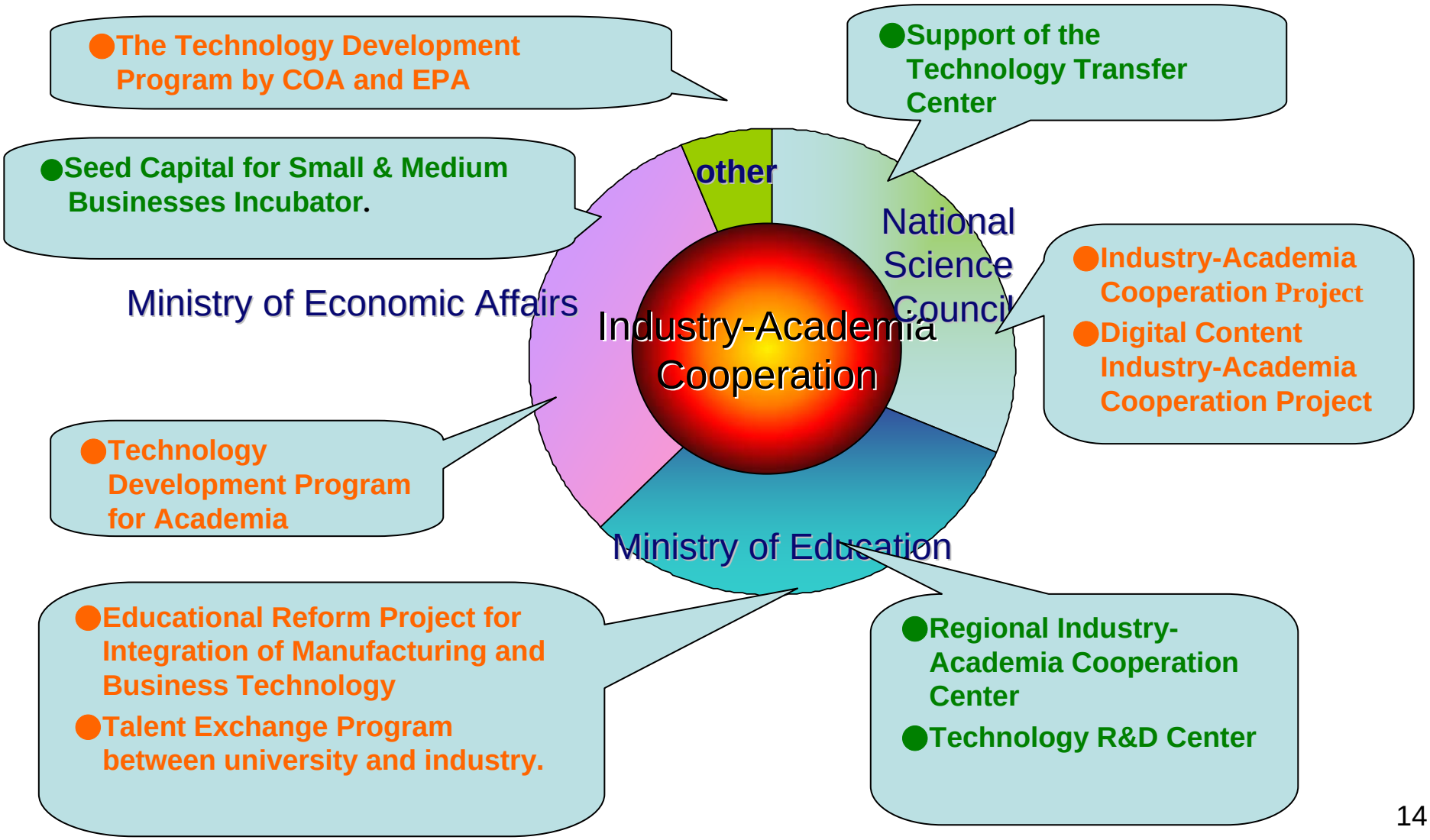
5.Universities are Granted Relatively Few Patents

❖ In 2004, the majority of United States patents issued to Taiwanese parties went to Industry. Universities were granted few patents.

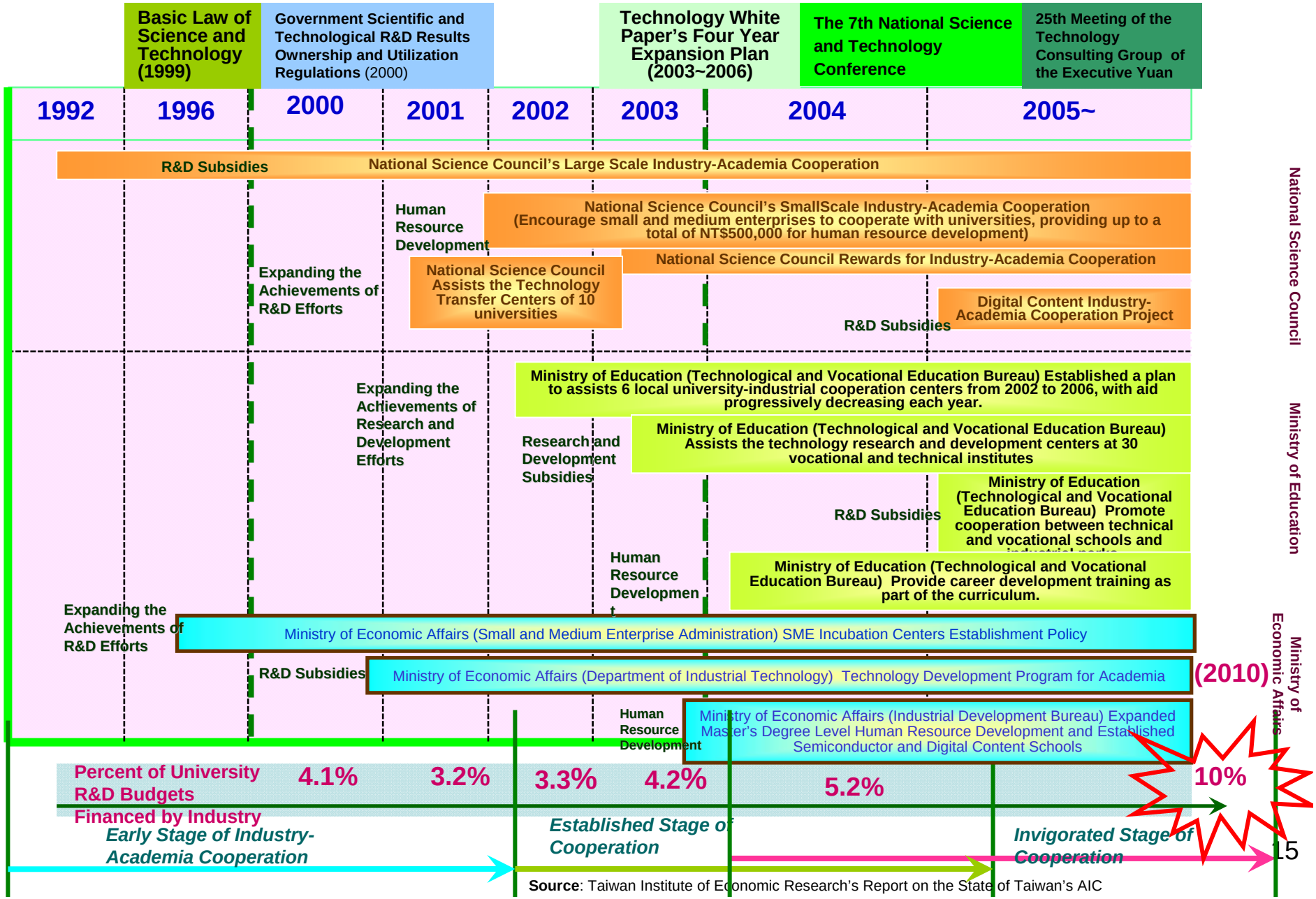
Year	Enterprise	Government	University	Research institution	Individual	Total
	The Number of Patents					
1996	741	50	2	126	1496	2415
1997	846	63	1	173	1496	2579
1998	1432	86		238	2020	3776
1999	2072	77	2	231	2168	4550
2000	3179	66	2	231	2462	5940
2001	3671	79	2	259	2628	6639
2002	3752	53	5	281	2770	6861
2003	3950	27	16	261	2662	6916
2004	4845	21	50	241	2441	7598

Source: Taiwan Institute of Economic Research, 2005

6.Government Projects for Advancing University-Industry Cooperation Among Agencies



7.Most University-Industry Cooperation focusing on Technology Diffusion



Source: Taiwan Institute of Economic Research's Report on the State of Taiwan's AIC

8.The MOEA's Industrial MS Program

1.Objectives：

- Use the Program complements the talent gap for R&D.
- A total of 5,000 persons to receive the training.

2.Profile：

- Establish training classes from enterprise and universities.
- The Meeting by MOEA, MOE and Central Personnel Administration.
- Subsidize NT$200,000 for each person.

3. Situation :

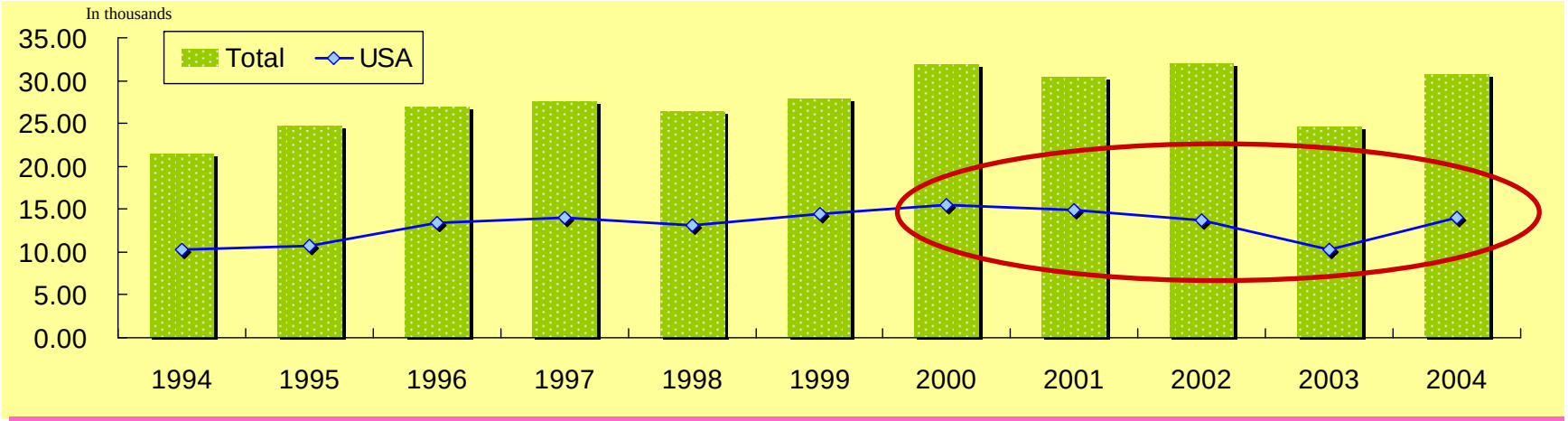
A total of 33 universities, 250 enterprises and 1,700 students joined this program.

4. The Congress denied the 2006 Budget.

5.The MOEA funding will be substituted by enterprises or individuals.

(III) Utilization of Overseas Talents

1.No Growth in Taiwanese Students Studying Abroad



Year	83	84	85	86	87	88	89	90	91	92	93
Total	**21,446**	**24,751**	**26,939**	**27,627**	**26,371**	**27,890**	**31,915**	**30,412**	**32,016**	**24,599**	**30,728**
US	10,309	10,679	13,425	14,042	13,109	14,443	15,547	14,878	13,767	10,324	14,054
CA	1,997	2,610	3,031	2,280	2,359	2,159	2,583	2,296	2,433	1,813	2,149
GB	3,968	5,131	5,095	6,414	6,173	6,553	8,567	7,593	9,548	6,662	9,207
FR	457	603	437	355	342	411	552	562	529	627	580
DE	481	462	312	345	305	295	313	345	400	442	402
AU	2,183	2,972	2,884	2,126	2,092	2,065	2,104	2,397	2,894	2,823	2,246
NZ	701	649	275	365	342	391	496	645	700	571	534
JP	1,350	1,645	1,480	1,700	1,649	1,573	1,753	1,696	1,745	1,337	1,556

Notes:

1.Visas issued to students by the American Institute in Taiwan are generally the F1 visa, which also includes short-term winter and summer programs (each week the student must take a minimum of 18 hours per week of courses)

2.Student visas issued by Canada, UK, Australia, Germany are for a period of study of at least three months.

Source: Ministry of Education, 2005

2.Taiwanese Students in the U.S. Decreased

- While Taiwanese students have steadily decreased, China, Korea, and India have taken over as the top sources of foreign students in the US.
- Because of this progressive decrease and the greater dispersion of remaining Taiwanese students across the US, the relationship between Taiwan and Silicon Valley's multinational high-tech community has atrophied. There has been an acute change in the high level international human resource landscape.

Year	Taiwan (ROC)	China	Korea	India
1993	37,432	45,126	28,519	35,946
1994	37,581	44,381	31,076	34,796
1995	36,407	39,403	33,599	33,537
2002	28,017	64,757	51,519	74,603
2003	26,178	61,765	52,484	79,736
2004	25,914	62,523	53,358	80,466

Source: Ministry of Education Website

3.Number of Foreign Students in Taiwan Remains Flat

Unit: Person

Country	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	Total
Asia	5,620	4,490	5,116	5,428	6,358	27,012
America	798	887	994	1,040	1,892	5,611
Europe	615	523	670	690	941	3,439
Africa	75	79	104	149	225	632
Oceania	146	125	143	168	200	782
Total	7,254	6,104	7,027	7,475	9,616*	34,476

Note: * means the number including the Taiwan Scholarship Programs' 585 persons.
Source: Ministry of Education, 2005.

4.Foreign Professionals Contribute to Only 22% of Taiwan's Expatriate Workforce

❖Between 2004 and 2006, there were only 10,240 foreign white collar technical professionals employed in Taiwan. This makes up 22% of the professional foreign workforce.

Foreign Professional Workers Receiving Work Permits from January 1, 2004 to January 31, 2006

Unit: Person

Education Level	Artists, Performers, and Religious Workers	Teachers at Private Language Schools	Specialized Technical Professionals (Total number who honored employment contracts)	School Teachers	Managers of Companies Established through Foreign or Overseas Chinese Investment	Athletes and Sports Trainers	Total
Doctorate	30	7	2	836	11	0	886
Master's	191	406	310	1,216	113	3	2,239
Bachelor's	6,539	14,878	5,805	1,587	978	83	2,9870
High School	7,943	1	4,047	25	183	80	1,2279
Junior High or Below	654	0	76	2	2	5	739
Total	15,357	15,292	10,240	3,666	1,287	171	46,013

Source: Statistics Office of the Council of Labor Affairs, 2006

5.Professionals from Overseas are Mainly in the Semiconductor and Flat-Panel Display Industries

Profile of Foreign Professionals Recruited to Work in Taiwan between 2003 and 2005

Units: Person

Industry	2003	2004	2005	Total	Percent of Total
Semiconductors	227	156	202	585	30.44%
Photonics	5	158	92	255	13.27%
Electronics (including Displays)	86	16	80	182	9.47%
Communiations	55	10	13	78	4.06%
Information Services	0	0	30	30	1.56%
Biotechnology	9	7	11	27	1.41%
Digital Content	0	16	9	25	1.30%
Other	217	293	230	740	38.50%
Total	599	656	667	1922	100.00%

Note: The "Other" category includes high level managers from fields such as Business Management, Accounting, and Finance.

Source: Industrial Development & Investment Center, MOEA (2005)

III. Discussion Topics

(I) Encourage R&D:

1. Maintain tax incentives and financial assistance to private companies engaged in R&D.
2. Continue to promote the Industrial MS Program.

(II). Promote Industry-academic Cooperation:

1. Make industry-academic cooperation a performance yardstick.
2. Integrate resources among government agencies and establish industry-academic cooperation support system.
3. Implement large scale industry-academic cooperation projects.
4. Conduct feasibility study to encourage spin-off enterprises from university.
5. The goal is to increase industry funding to 10% of the total university R&D expenditure by 2010.

(III) Promote the Exchange of International Talents :

1. Review the overall policy and strategy for recruiting foreign talents.
2. Ehance “The Elite Studying Abroad Program” .
3. Maintain “Taiwan Scholarship Program”.

(IV) Promote International Cooperative R&D:

1. Encourage universities, corporations, and research institutions to join international R&D projects.
2. Encourage enterprises to establish R&D centers overseas.