Topic 1：Reform Strategy for Intellectual Property Management and Commercialization

Subtopic 1:
Government Funding Strategy Reform on Intellectual Property Management and Commercialization

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Outlines

I. Introduction

II. Analysis on S&T budget and advancement policies

III. Key challenges

IV. International benchmarking research

V. Discussion on proposed strategies

I. Introduction

- To review the S&T budget on knowledge commercialization (KC) and the input-output gap.

Review of the government's investment and innovation mechanisms

1. Review of the S&T budget on KC as a base of planning 2015 S&T budget

2. Review of the government actions on KC and innovation mechanisms

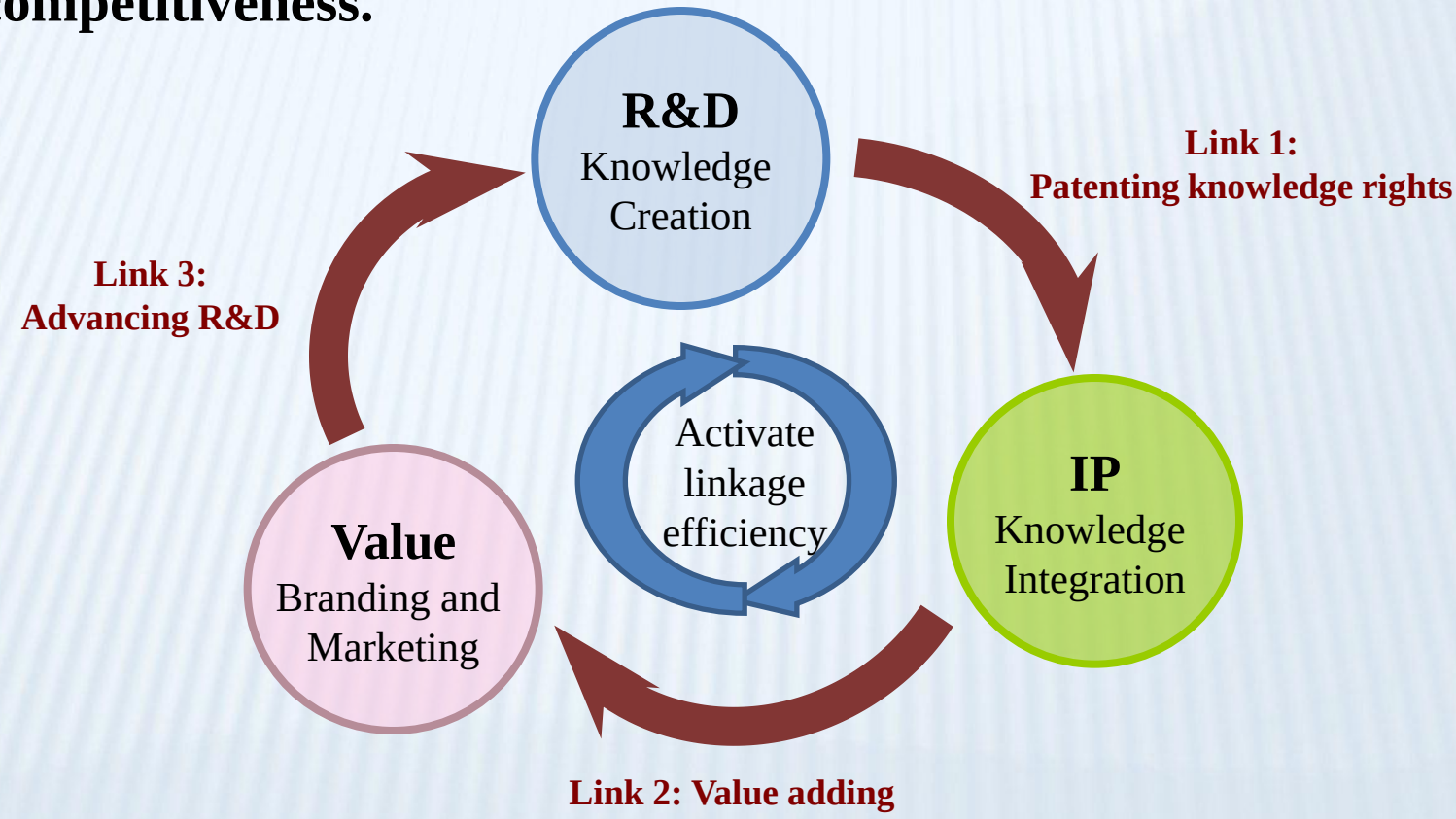
II. Analysis on S&T budget and advancement policies

The KC model as the base of reviewing the S&T budget and advancement policies

II. Analysis on S&T budget and advancement policies(1/5)

The KC model

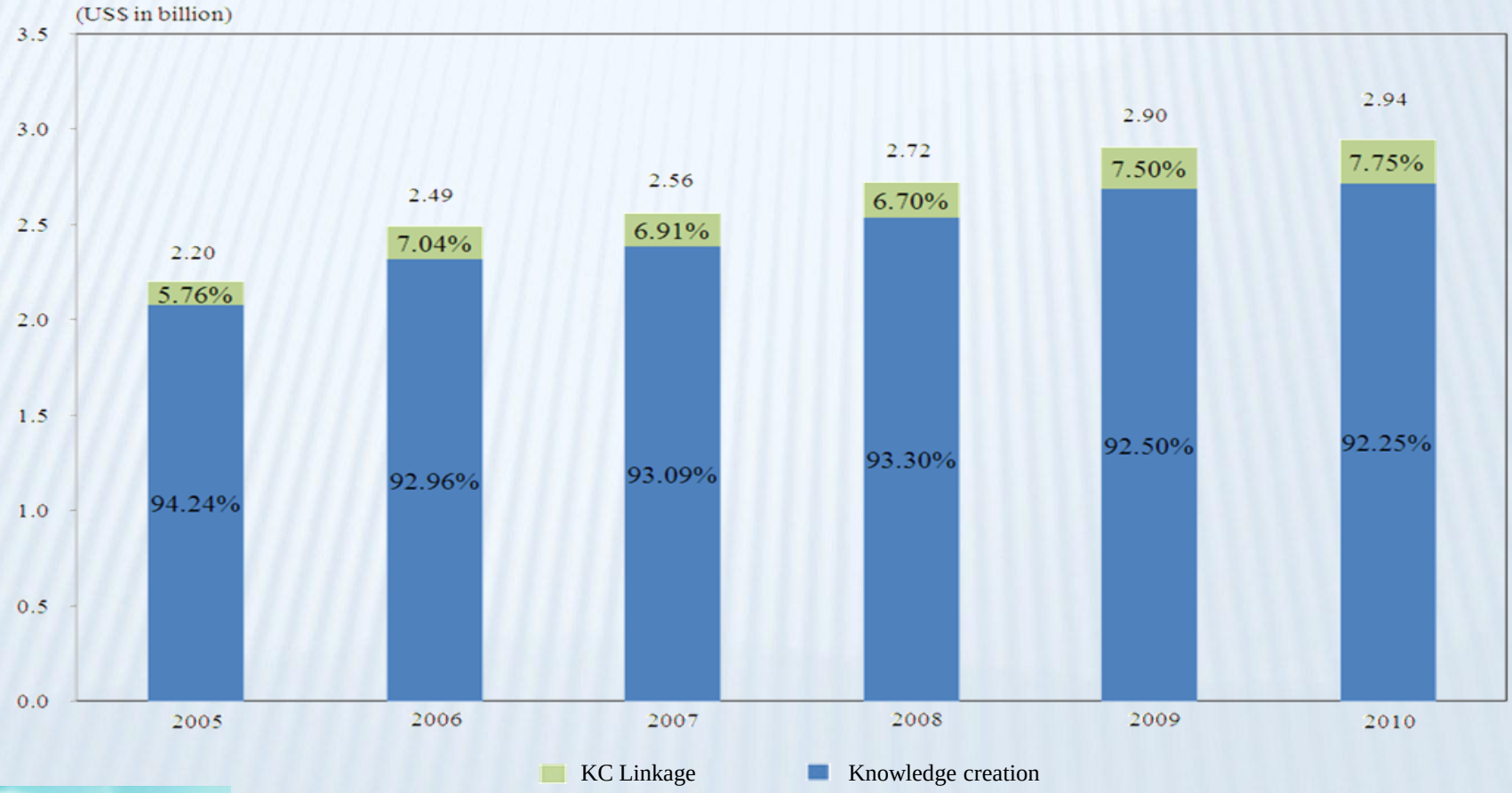
- **Through the KC model, the government investment is to acquire the IP commercialization and to enhance the country's competitiveness.**



II. Analysis on S&T budget and advancement policies (2/5)

The government budget allocation

- **The S&T budget increased slightly annually in the past 6 years. In 2010, 92% is allocated to knowledge creation, whereas only 8% to KC linkage.**

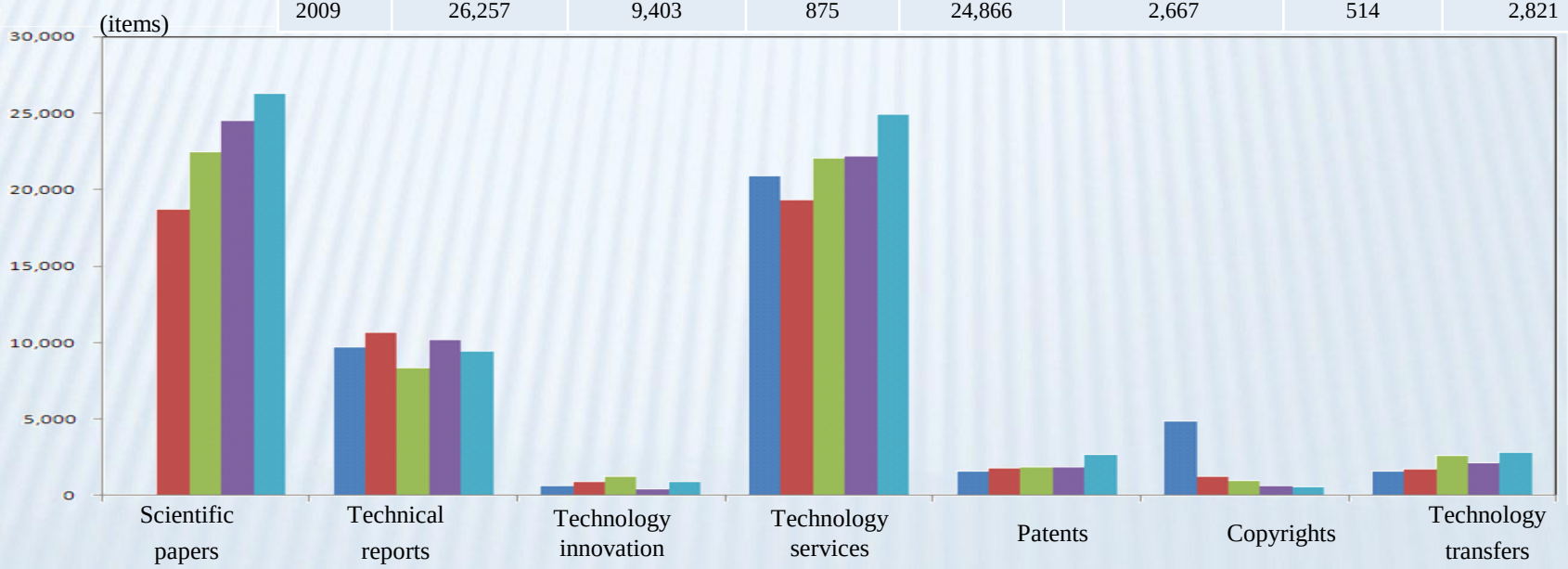


II. Analysis on S&T budget and advancement policies(3/5)

Substantial achievements in knowledge creation through research

■**The challenge ahead: KC of vast scientific papers and technical reports, 2005-2009**

	Scientific papers	Technical reports	Technology innovation	Technology services	Patents	Copyrights	Technology transfers
2005	N/A	9,674	612	20,842	1,562	4,862	1,597
2006	18,707	10,666	862	19,332	1,793	1,225	1,722
2007	22,443	8,289	1,214	22,044	1,809	979	2,562
2008	24,488	10,143	423	22,180	1,862	590	2,091
2009	26,257	9,403	875	24,866	2,667	514	2,821



Source: Science and Technology Yearbook (2009)

II. Analysis on S&T budget and advancement policies (4/5)

Projects for KC linkage

■ **7.5% of US$2.9 billion 2009 S&T budget was for 46 KC projects.**

Category	Item	Budget (US$ in million)	Project attributes	Executing ministries
Patenting knowledge rights	10	8	Training & infrastructure establishment on IP and commercialization	NSC, MOEA, COA
Value adding	25	191.75	Strengthening technology transfer system; establishing incubation centers to accelerate commercialization	MOEA, MOE, COA
Advancing R&D	11	17.81	Supporting academy-industry cooperation and accelerators; clustering university research	NSC, MOEA, MOE, COA
Total	46	217.56		

II. Analysis on S&T budget and advancement policies(5/5)

KC projects among different government ministries and councils

NSC

- Operating guidelines for subsidizing the management and extension of R&D results, and related rules and forms for R&D results and benefits
- Program to upgrade industrial technology and enhance human resources
- Industry-university cooperative research projects
- Industrial-academic cooperative research on innovative technology for science parks
- Industrial development projects for agricultural biotechnology
- Foresight Taiwan

MOE

- The incentive program of the performance of academy-industry collaboration
- Performance evaluation program for regional industry academia collaboration
- MOE award implementation directions for outstanding collaboration accomplishments between industry and universities/colleges
- Academia industry collaboration plan information network
- Technology R&D and industry-academia collaboration program
- Rules governing collaboration between universities and industry

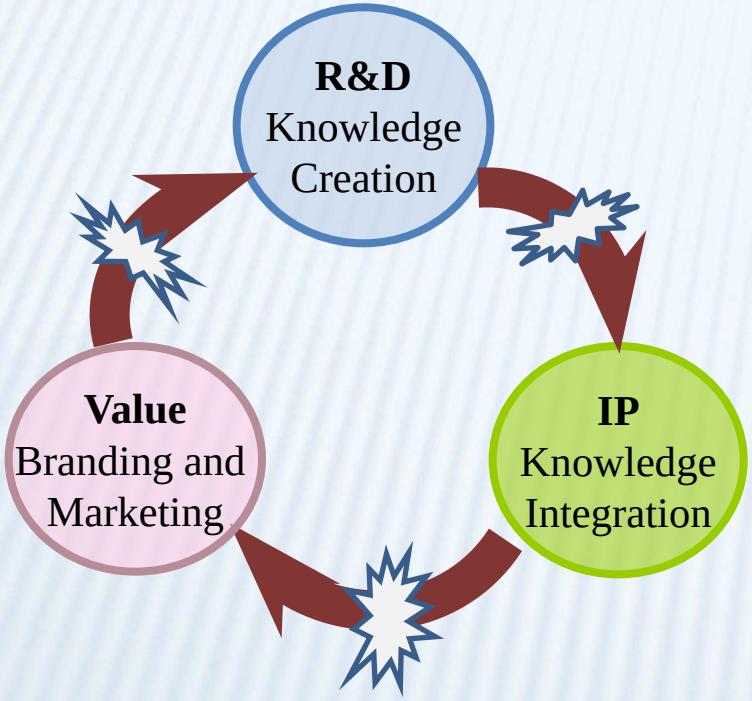
MOEA

- The value-added plan for collaboration between industry and universities on new business incubation
- Intellectual property circulation and utility plan
- Intellectual property value project for innovative smes
- Technology development program for academia
- New leading products development program
- Project of innovative integrated service of smes clusters
- Small business innovation research (SBIR)
- Industrial technology development program
- Nanotechnology industrialization promotion project
- Regulation on ministry of economic affairs enhancing research institutes for the developing of industrial technology
- Digital conversion project of TW patent document
- Optimization of foreign patent information search
- Plan for the cultivation and training of intellectual property professionals

COA

- The R&D and industrialization promotion for the biotechnology in agriculture
- Strengthening linkage between Industry-university cooperation and business incubator in Agri-Tech development
- Intensifying agricultural biotechnology park development and promoting agribusiness technique
- Guidance on Industry-University Cooperation Projects of Agri-technology

III. Key challenges



Issue1: Inefficiency in the process of patenting knowledge rights

a. Improve contributions of accumulated IP to the industry
b. Strengthen global IP deployment
c. Design incentives for researchers to patent created knowledge

Issue2: Limited multiplying effects from academy-industry (A-I) cooperation

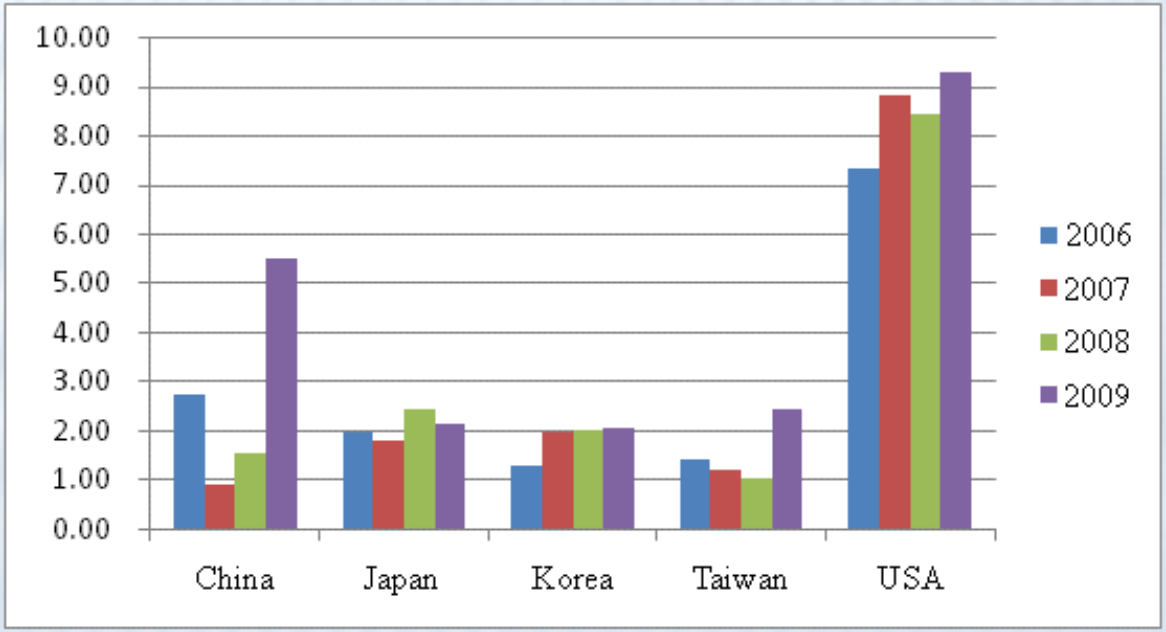
d. Increase commercialization of IP
e. Encourage the business sector to engage in R&D on value-adding
f. Support the business sector to participate in A-I cooperation
g. Reinforce the academy's function on KC

Issue 1: Inefficiency in the process of patenting knowledge rights

a. Improve contributions of accumulated IP to the industry

- Taiwan patents increase annually and Taiwan ranks fifth in obtaining US patents in 2009. Taiwan's technology balance payments have increased to 27% in 2007, which still lags behind many advanced countries. And most of Taiwan patents are process types, but not core.
- Comparison of average non-patent reference (NPR) citation for a semiconductor patent obtained in the US in 2009 reveals that Taiwan needs to strengthen bridging knowledge to commercialization.

Average non-patent reference (NPR) citation for a patent among 5 countries



Source: STPI

Issue 1: Inefficiency in the process of patenting knowledge rights

b. Strengthen global IP deployment

- **The ranking gap between TPF and USPTO for Taiwan implies that Taiwan needs to enhance its global IP deployment.**

Country ranking of the trilateral patent families (TPF) and the US Patent and Trademark Office (USPTO) from 1988 to 2007

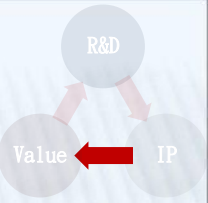
TPF Rank	Country	USPTO Rank	TPF Rank	Country	USPTO Rank
1	U.S.	1	14	Finland	15
2	Japan	2	15	Israel	13
3	Germany	3	16	Austria	17
4	French	6	17	Denmark	19
5	U.K.	7	18	Spain	20
6	Switzerland	10	19	Norway	23
7	Netherlands	11	20	Russia	25
8	Italy	9	21	Taiwan	4
9	Sweden	12	22	China	48
10	Canada	8	23	Singapore	22
11	Korea	5	24	Ireland	26
12	Australia	14	25	India	21
13	Belgium	16	26	NZ	28

Source from Dar-Zen Chen (2010)

Issue 1. Inefficiency in the process of patenting knowledge rights

c. Design incentives for researchers to patent created knowledge

- Taiwan has about 130,000 people engage in R&D. Among 20,000 doctoral researchers, 80% of them work in the academic community.
- The paper publication is the key criteria for the university faculty promotion. And this deters them from patenting the created knowledge.
- Most universities and research institutes are deficient in IP personnel. Much of IP matters are handled by non-specialists.



Issue 2. Limited multiplying effects from A-I cooperation

d. Increase commercialization of IP

- Commercialization rate for the approved patents is merely 0.3% in 2006.
- Lack of flexibility in technology transfer; exclusive licensing requirement discourages enterprises in adopting new technologies.
- There are duplications of IP information platforms that need to be integrated.

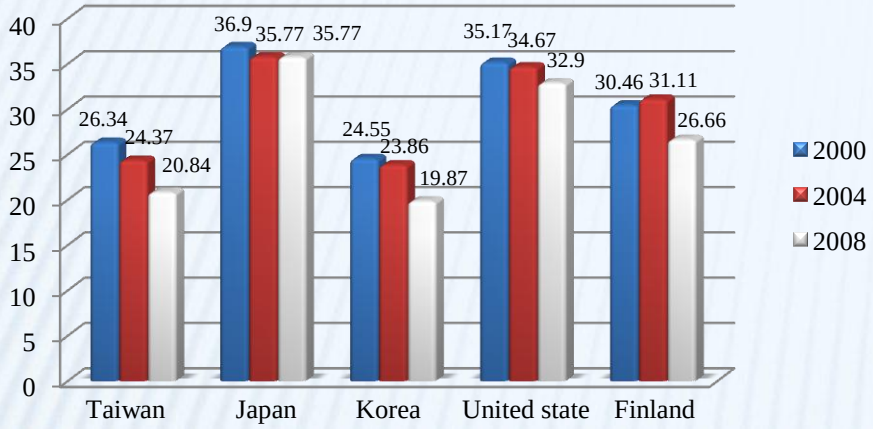
Databases for IP Information

Web	Sponsor	Source of data
Taiwan Technology Marketplace (TWTM)	Industrial Development Bureau, MOEA	Companies, research institutes, and users
Technology Transfer Services	Department of Industrial Technology, MOEA	Research Institutes
Scientific and Technological Resources, Information, and Knowledge Exchange	Department of Central Processing, NSC	Universities in Taiwan
Patent & Trademark Search	Intellectual Property Office, MOEA	Patentees
Technology Enhancement Project for Small & Medium Enterprises	Small and Medium Enterprise Administration, MOEA	Small and medium enterprise
Finance to Small and Medium Enterprise	Small and Medium Enterprise Administration, MOEA	Small and medium enterprise
Taiwan Agriculture TechnoMart	COA	Research institutes

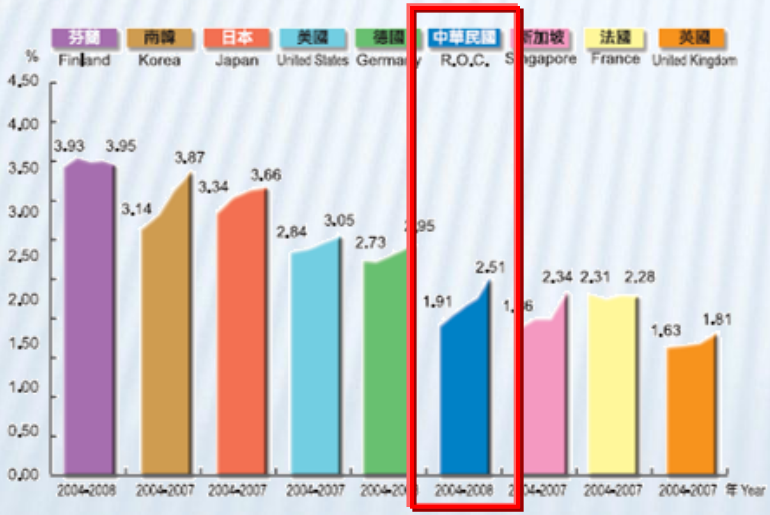
Issue 2. Limited multiplying effects from A-I cooperation

e. Encourage the business sector to engage in R&D on value-adding

The nominal value-added rate of manufacturing



BERD/Value added in industry (%)



Source: Indicators of S&T Taiwan (2009)

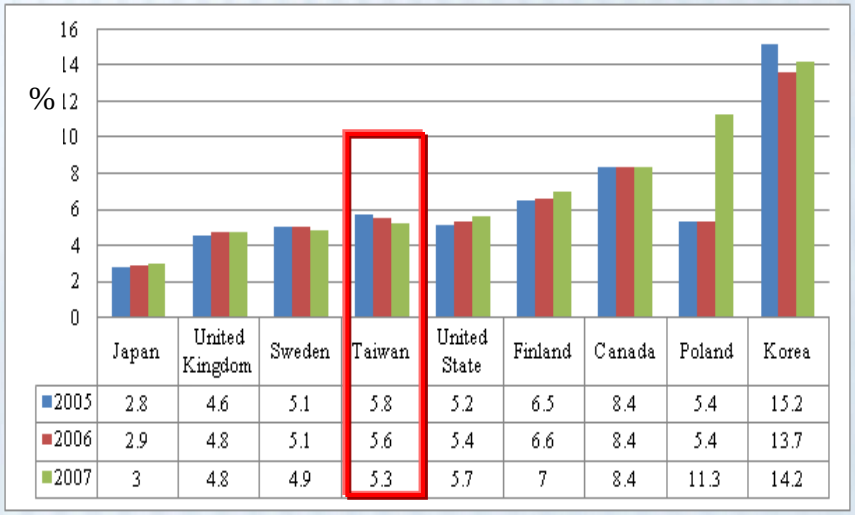
- **Taiwan's nominal value added rate in the manufacture sector was higher than Korea, but lower than the US and Japan.**
- **Enterprise R&D intensity (enterprise R&D expenditure as a percentage of industrial value added) grew from 1.91% in 2004 to 2.51% in 2008. But the intensity is still low.**

Issue 2. Limited multiplying effects from A-I cooperation

f. Support the business sector to participate in A-I cooperation

- **The enterprise financed over 70% of R&D expenditure in Taiwan. Its contribution to the higher education is comparable to the Western countries. Considering a higher proportion of researchers to be high-level, there still is a room for further investment by the enterprise.**

Percentage of higher education R&D expenditure financed by industry



	Japan	United Kingdom	Sweden	Taiwan	United State	Finland	Canada	Poland	Korea
2005	2.8	4.6	5.1	5.8	5.2	6.5	8.4	5.4	15.2
2006	2.9	4.8	5.1	5.6	5.4	6.6	8.4	5.4	13.7
2007	3	4.8	4.9	5.3	5.7	7	8.4	11.3	14.2

Source: Indicators of S&T Taiwan (2009)

- **Breakthrough Thinking**
  - **Sharing scheme of IP such as co-ownership of IP rights, distribution of remuneration, etc. in the government funded projects needs to be devised.**
  - **The research community should play as a forerunner in innovative R&D for the enterprise. (Wu *et al.*, 2000)**

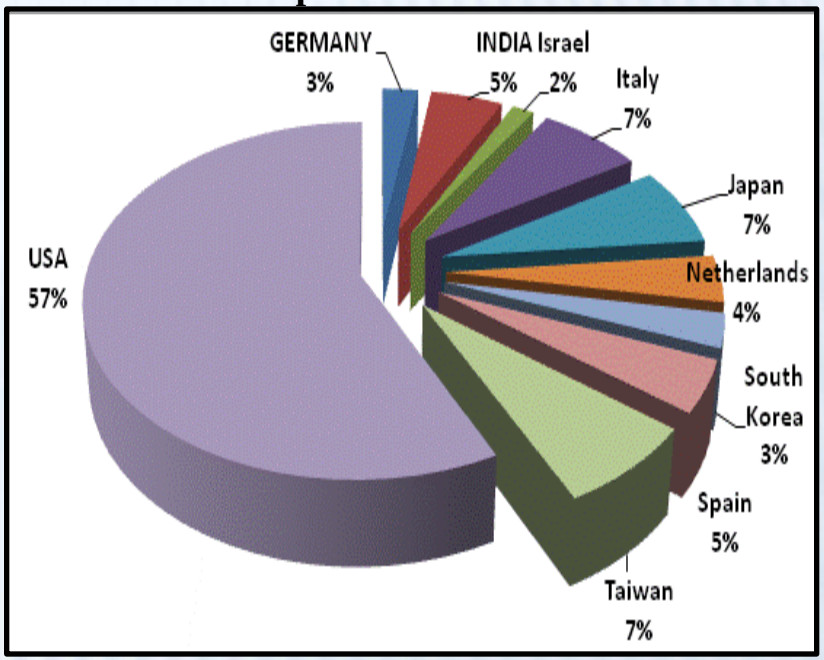
Issue 2. Limited multiplying effects from A-I cooperation

g. Reinforce the academy's function on KC

Semiconductor manufacturing, a leading industry in Taiwan, as a case

- **A total of 34,502 papers in semiconductor were published globally 2006-2009. Among them, 5.3% were from Taiwan, whereas 23.9%, 11.3% and 6.1% from the US, Japan and Korea, respectively.**
- **In the same period, 1,541 US patents were granted to Taiwan, of which 284 papers were cited and only 20 were from Taiwan.**

Percentage of origins of cited papers in U.S. granted semiconductor patents from 2006 to 2009



Source: STPI

Issues need to ponder

- **Why much patents of the research-intensive semiconductor industry were derived from foreign research?**
- **Why public goods such as scientific publications lack of innovation for the industry?**

IV. International Benchmarking Research

IV. International Benchmarking Research(1)

Global trend in the advancement of IP development

According to the World Intellectual Property Organization (2010), there are 23 countries deal with IP as parts of national strategies.

Strategic Planning	Implementation	Countries (Coordinating agencies)
Establishment of a coordinating office for promoting IP strategy	Inter-ministerial committees	Japan (Intellectual Property Strategy Headquarters) Australia (Science and Innovation Ministerial Council)
	Consolidate innovative research among different ministries and create a new ministry/agency to oversee all activities	Korea (Ministry of Knowledge Economy) Denmark (Agency for Science and Technology)
Development of a long term IP promotion plan based on national consensus	The National Action Plan on IP formulated by the prime ministers office according to the conclusions of National meetings.	US (American Competitiveness Initiative) UK (Digital Britain) French (France NumErique 2012) EU (2010 European Innovation Act)

IV. International Benchmarking Research(2)

Move from knowledge accumulation to patent knowledge

- **Promotion of basic research**
  - Establishment of large and interdisciplinary research centers of excellence as in the USA
  - Impact award system for researchers as in Japan
  - Increase budget for basic research as in the USA and Korea
- **Recruitment of foreign researchers**
  - Amendment of immigration law as in the USA
  - Establishment of institutes that employ foreign researchers as in Japan
  - Establishment of overseas research centers as in Japan
  - Establishment of international advanced research centers as in Japan
- **Establishment of IP management and incentive systems**
  - The incentives for KC such as the US Federal Technology Transfer Act
  - Technology licensing offices in Japanese universities or research institutes to commercialize the results of public research

IV. International Benchmarking Research(3)

Promote knowledge commercialization

- **Improving the efficiency of patent application reviews**
  - **Strengthening patent quality, mechanism of Patent Prosecution Highway, improvement of patenting behavior, or patent search outsourcing**
- **Establishment of good environment for technology transfer**
  - **Recruitment of qualified and experienced personnel in technology licensing offices, strengthening technology transfer organizations, or promoting university and industry cooperation**
- **Management and reassessment of non-used patents in universities or research institutes**
  - **Establishment of IP managing company for enhancing value and competitive strengths of the industry by finding and transferring of domestic IP while managing invention capital.**

IV. International Benchmarking Research(4)

Strengthen IP competitiveness and A-I Cooperation

- **Developing core technology in major industries**
  - Highly vertical integrated production chain to identify core technology in the field of strategic industries in Korea
- **Strengthen the IP negotiate mechanism**
  - Creating of IP managing company to respond to patent trolls overseas and 220 non practicing entities (NPE) that derive profit from patent licenses without manufacturing patented technologies/goods
  - Establishment of overseas legal department for business enterprise to deal with IP issues
- **New models and incentives of university industry cooperation**
  - Encouraging industries to provide research assistantship for Ph.D. students
  - Promoting university-industry alliances for the development of key technologies
  - Developing platform for innovative cooperation network
  - Tax exemption and deduction of the royalty payment

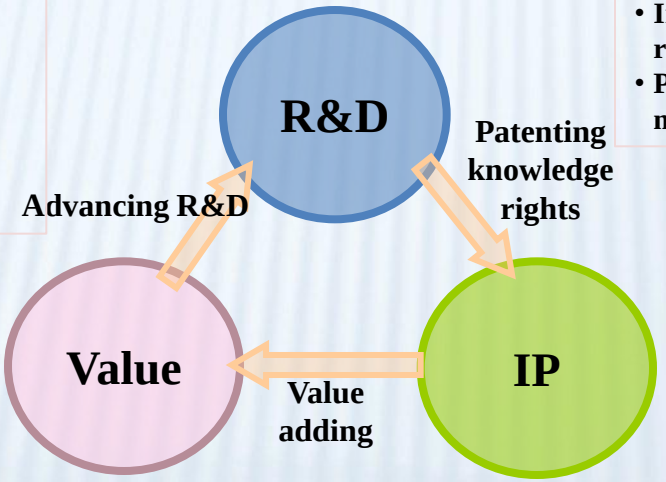
IV. International Benchmarking Research(5)

Japan's National IP Strategy

Policy: Intellectual Property Policy Outline
Implementation: Intellectual Property Strategy Headquarters
National Strategy: To enhance competitiveness by enriching Japan with IP rights, such as Japan's *Intellectual Property Strategy Program*.

- Impact award system for researchers
- Establishment of institutes that employ foreign researchers
- Establishment of international advanced research centers
- Establishment of overseas research centers

- University playing active role in the Economy
- Launching industrial clusters plan to network industry, universities and public research institutes
- Introducing intermediary for university-industry cooperation linkage
- Establishing regional university-industry cooperative centers



- Improvement of mechanisms for research result patenting, transfer, commercialization
- Promoting IP awareness by publishing IP management guidelines

- Development of soft power industries
- Participation in the development of international standards of green energy
- Development of brand strategy
- Establishment of overseas legal department for business enterprises to deal with IP issues

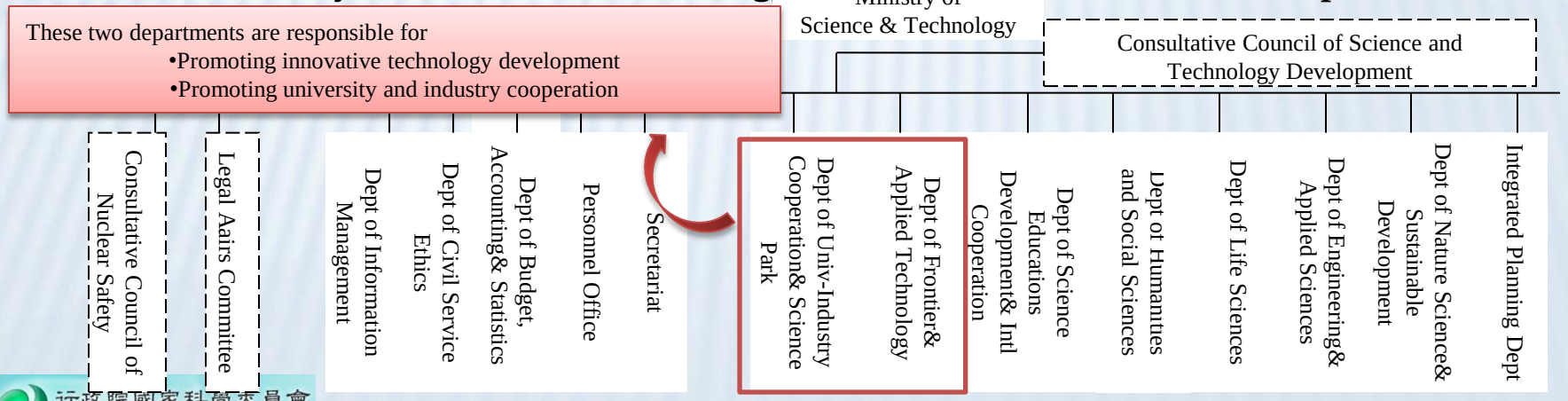
- Good system for patent application reviews
- Improving the efficiency of patent reviews
- Emphasis on global layout with patents

- Widely available technology licensing offices
- Strong national policy framework for IP management
- Initiation of IP related funds to enhance utilization of the technologies developed by academic community

V. Discussion on proposed strategies

Create IP opportunities

- **The Executive Yuan decided to budget NT$11.8 billion (~US$368 million) to support a project aimed at commercializing patents proposed by MOEA in September.**
  - **This project will help the island's patent holders to commercialize their patents, in a bid to create 39,000 jobs and generate revenue of NT$120 billion (~US$3.7 billion) .**
- **Organization Law for the reconstruction of the Executive Yuan was passed in the Legislative Yuan earlier this year. the National Science Council and Atomic Energy Commission will be merged into the Ministry of Science and Technology.**
  - **The new Department of University-Industry Cooperation and Science Park in future Ministry of Science and Technology is expected to function IP development at a**



Proposed strategies(1)

Advance IP innovation policies

- **Program**
  - Formulate a national strategy on intellectual property right (IPR), and bring the IPR management into the whole process of scientific and technological management.
- **Focus**
  - A specialized committee across ministries to coordinate implementation of IP strategy development
  - Compilation of the “ROC White Paper on National IP Strategy” periodically
  - Annual IP implementation report with international benchmarking research for future improvement
- **Goals**
  - Long-term planning and systematic integration of policy-related resources to enhance and improve infrastructure of KC model in order to sustainably maintain our national competitiveness

Proposed strategies(2)

Promote knowledge commercialization

- **Program**
  - Set up a target funding ratio of the government S&T budget in promoting the "linkages" in KC model (for example, is 12% enough?).
- **Focus**
  - "Previous performance of technology transfer of R&D" and "potential of commercialization" as important criteria for project selection
  - Retain a percentage of government S&T budget for promoting commercialization of R & D results
  - Flexibility with the type of technology licensing
  - Long term valuation for R&D projects
  - Strengthening the role of government on promoting IP commercialization
- **Goals**
  - Strengthening the "linkages" in KC model will increase economic effects of S&T research.

Proposed strategies(3)

IP trends analysis and global IP deployment

- **Program**
  - Develop The foresight mechanism of the industrial technology of Taiwan and global layout with patents.
  - Establish a mechanism for academic community to develop industry-oriented front technologies.
- **Focus**
  - Identify core technology for major industries and develop National IP Strategy.
  - Integrate the resources of academic community to develop industry-oriented key technology.
  - Encourage academic community to upgrade Taiwan's industries by their research.
  - Give higher priority on funding overseas patent application of core technology generated from government-sponsored R&D.
- **Goals**
  - Promoting national industry development and upgrading national competitiveness

Conclusion

- With the efforts from government, we have made progress in overcoming the obstacles to KC model.

- In order to create the next golden age of sustainable competitiveness for Taiwan, we have to integrate the public and private manpower and resources to promote KC model in a systematic manner.

Discussion

- How to advance IP innovation policies?
- How to expedite the exploitation of IP with S&T research outputs?
- How to deploy key IP globally?

Thank you for your attention!