經濟部

The 31st STAG Board Meeting

Theme I: S&T Policy Formation and Governance

1.2 Implementation of S&T Policy and Budget Allocation, Ministry of Economic Affairs

Dr. Ming-Ji Wu

Director, Department of Industrial Technology, Ministry of Economic Affairs

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DOIT 經濟部技術處
Ministry of Economic Affairs

Presentation Outline

Strategic Planning of Industrial S&T Policies

Problems of Government R&D Budget Allocation

Connecting Technology and Innovation

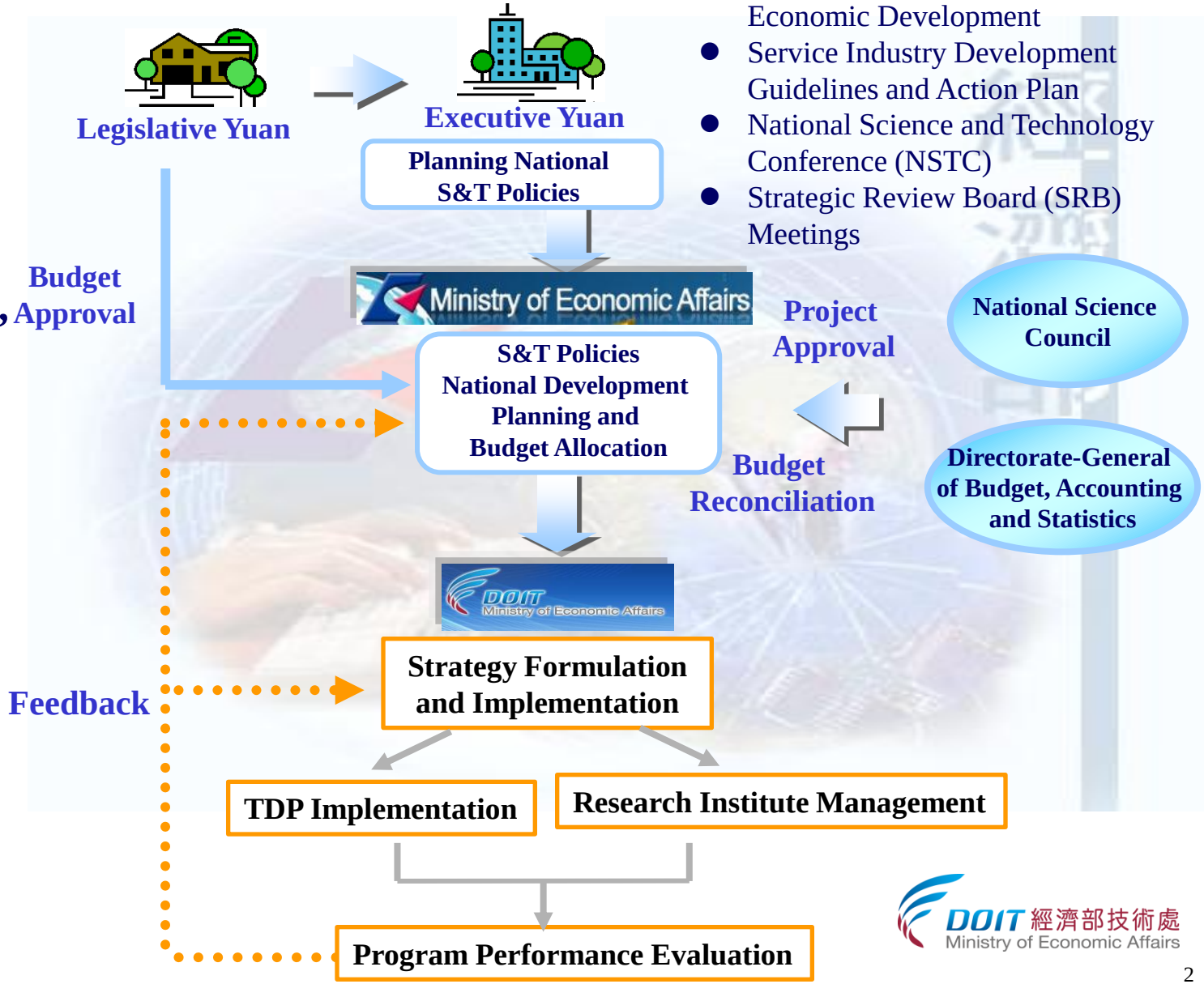
New Approaches in Resource Allocation beyond Government Restructuring

Recommendations

I. Strategic Planning of Industrial S&T Policies

1. Process to Focus Industrial S&T Policy Resources

It is important to foresee industrial development trends in the implementation of TDPs, and at the same time maintain alignment with national S&T policies to ensure that TDPs meet national industrial development needs.



- Resource Allocation in National Economic Development
- Service Industry Development Guidelines and Action Plan
- National Science and Technology Conference (NSTC)
- Strategic Review Board (SRB) Meetings

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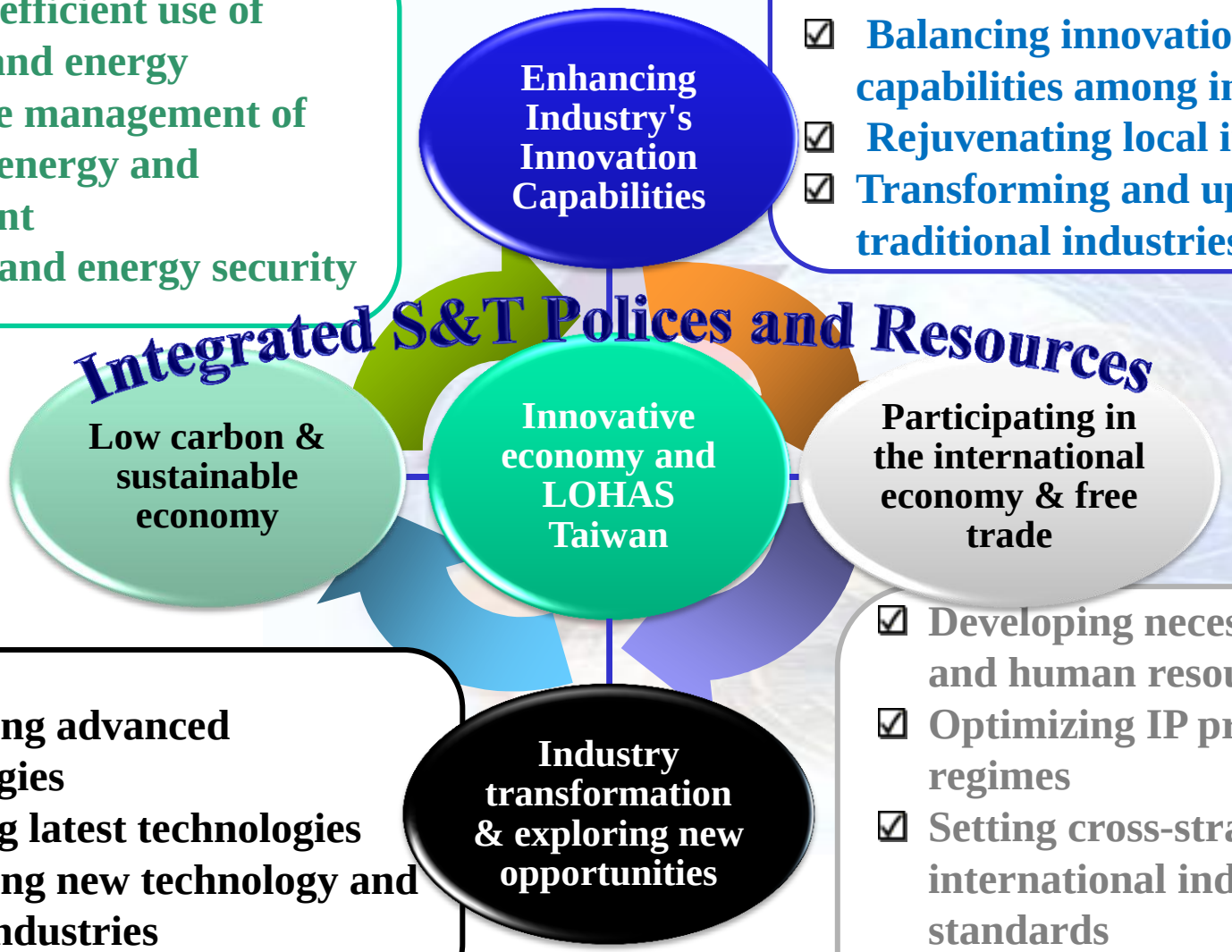
2. The Role of S&T in MOEA Policy Implementation

- ☑ Clean and efficient use of resources and energy
- ☑ Sustainable management of resources, energy and environment
- ☑ Resources and energy security

- ☑ Developing fundamental and core industrial technologies
- ☑ Balancing innovation capabilities among industries
- ☑ Rejuvenating local industries
- ☑ Transforming and upgrading traditional industries



- ☑ Developing advanced technologies
- ☑ Applying latest technologies
- ☑ Developing new technology and service industries

- ☑ Developing necessary skills and human resources
- ☑ Optimizing IP protection regimes
- ☑ Setting cross-strait and international industrial standards
- ☑ Responding to impact on trade liberalization

3. Current Major National S&T Issues/Programs

- **Current Major Industrial Technology Programs in Taiwan**
  - Six Key Emerging Industries
  - Four Core Knowledge-Based Industries (Cloud Computing, Electric Vehicles, Patent Commercialization Services and Green Architecture)
  - Developing Fundamental and Core Industrial Technologies Program and Intelligent Automation Program
  - "Regional Innovation Corridors" Program
  - "Smart Living Technology & Service" (i236) Program and ICT Value-Added Program (Business Districts, Traditional Manufacturing Industries and SMEs)
- **National Science and Technology Program**
  - National Program for Intelligent Electronics
  - Networked Communications Program
  - National Science and Technology Program (Energy and NPNT)
  - Taiwan e-learning and Digital Archives Program
  - National Research Program for Biopharmaceuticals

4. Current Important Strategic R&D Projects Launched by the MOEA

Smart Technologies

- Implementing telematics applications and services
- Enhancing 3DIC manufacturing and system integration technologies
- Implementing various "Smart Living Technology & Service" Program (i236)

Manufacturing Sophistication/ Fundamental Industrial Technologies

- Preliminary development plan for control systems for next generation intelligent factory
- Program for equipment development for micro-metallic component
- Development project of key mechanical technologies in emerging industries
- Bridging the R&D capabilities between research institutes and universities, promoting innovation in regional industries, supporting S&T development in SMEs and help the transformation and upgrade of the traditional industries
- Development of 10 Key Basic industrial technologies

Green Energy

- Developing high safety lithium-ion batteries with long battery life to accelerate intelligent vehicle development
- Promoting domestic electric vehicle research consortia and industrial clusters
- Project for next generation energy storage components and systems
- Thin film solar cell processing equipment and modules R&D program

Health and Well-Being

- Developing distributed healthcare system based on local conditions
- Setting up Rapid Prototyping Center (RPC)
- Promoting internationalization of generic drug industries
- Developing high-end medical imagery materials

Service Innovation

- Cloud computing systems and application service development project
- Service Ecosystem Research Value Engineering (SERVE) program

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5. Strategic Planning of Industrial S&T Policies

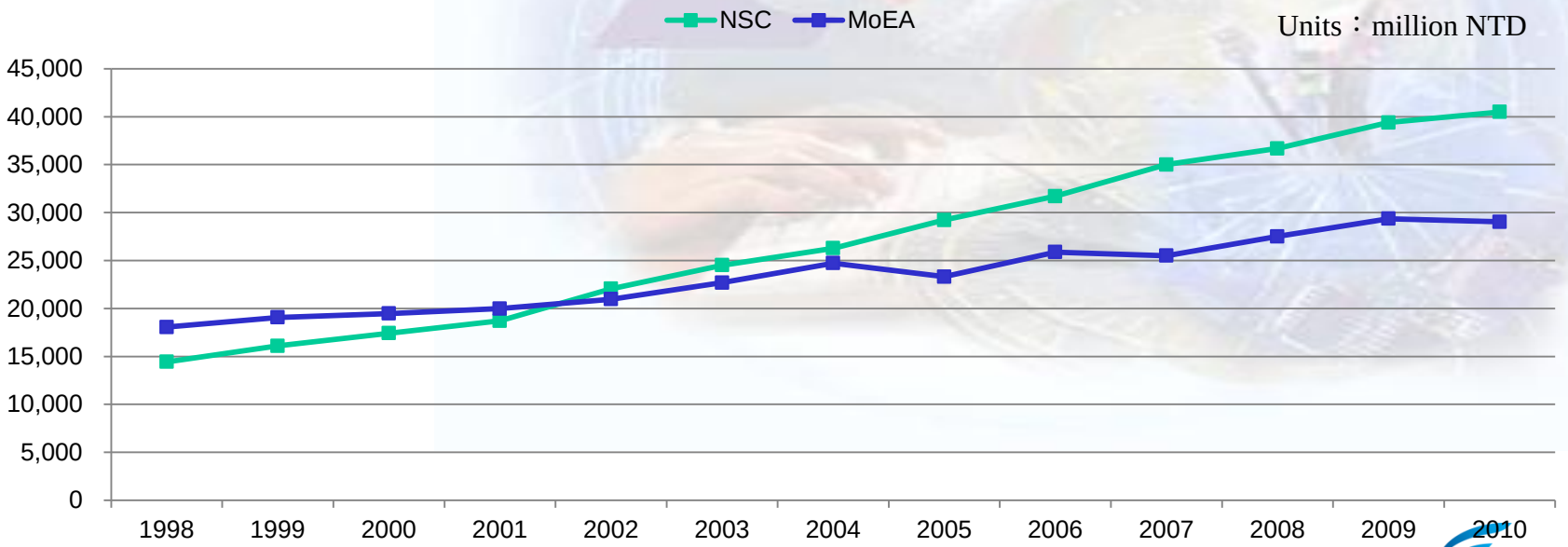
- **The Process of Forming Strategic Planning for Industrial S&T Policies**

1. **Strategic planning is based on major national S&T and MOEA policies**
2. **Coordination and consultation between the National Science Council and the Directorate-General of Budget, Accounting and Statistics**
3. **Forming applicable industrial S&T policies**

II. Problems in Government R&D Budget Allocation

1. Government R&D Budget Allocation in Recent Years

- **The National Science Council (NSC) has received much higher R&D budgets than the Ministry of Economic Affairs in recent years.**
- **In 2010, the budget for the NSC accounted for 43% of the government's total R&D budget, whereas the budget for the MOEA, Academia Sinica and the Department of Health accounted for 30.8%, 11% and 5.5% , respectively.**



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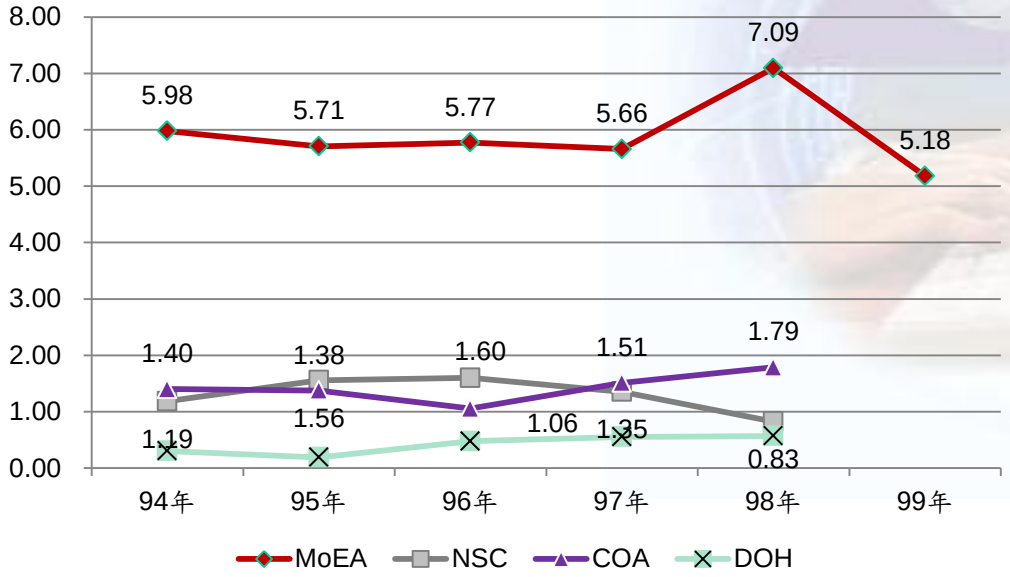
Source: National Science Council

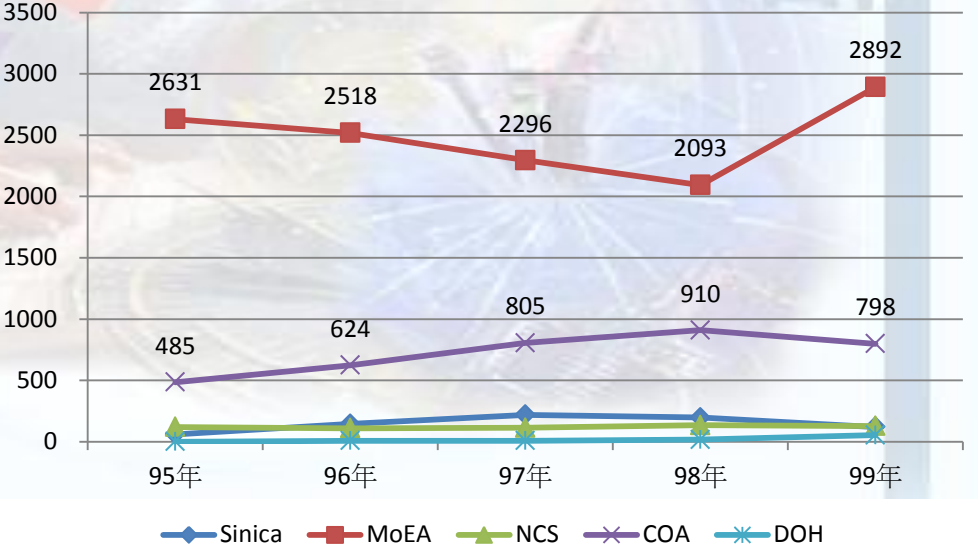
2. Performance of R&D Projects among Government Ministries

- On average, the MOEA's Technology Development Program has received more than 5 patents per NT$100 million of R&D spending from 2005 to 2010 and successfully created a number of world-leading products, such as ultra-thin flexible stereo speakers.
- The MOEA has created more than NT$2 million of treasury income per NT$100 million of R&D budget

Patents granted per NT$100 million R&D budget (cases)



Treasury income per NT$100 million R&D budget (NT$ thousands)



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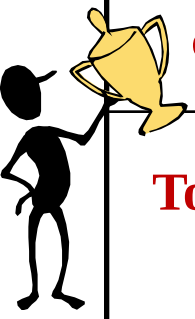
Source: National Science Council

3. R&D Performance among Major International Research Institutes

The number of high quality US patents granted to major international research institutes during the 2005-2009 period

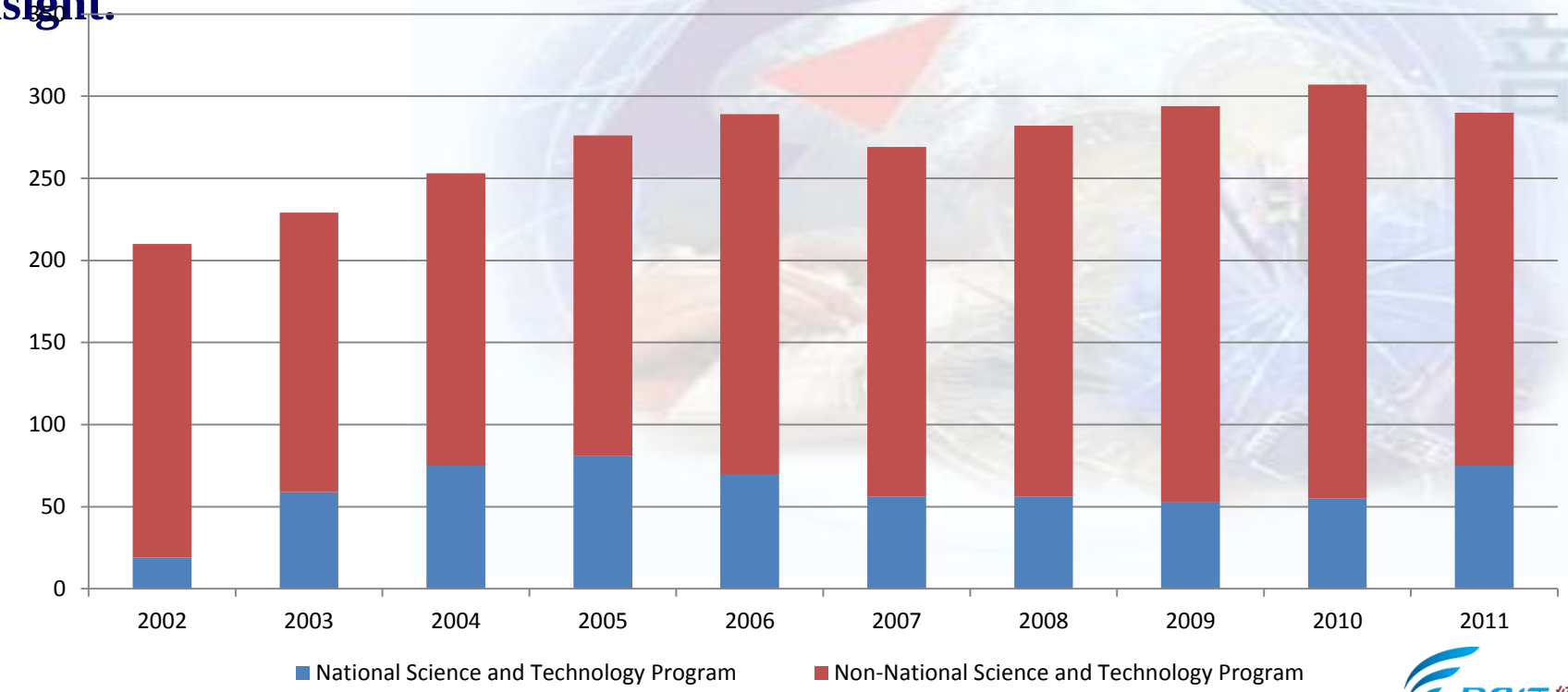
Research Institute	ITRI (TW)	SRI (US)	FhG (DE)	NRC (CA)	AIST (JP)	CSIRO (AU)	TNO (NL)
Global top 5% of most frequently cited patents	64	52	20	8	17	5	1
Global top 20% of most frequently cited patents	214	115	70	29	55	23	6
Total number of US patents	1,364	272	312	134	351	101	58



Source: Technology Transfer Center of ITRI

4. Share of National Science and Technology Programs in R&D Budget

- Over the last few years, several major national S&T issues have been raised.
- The share of National Science and Technology Program funding to the total government R&D budget has climbed significantly since 2011.
- National Science and Technology Programs are led by universities; as a result, most of them exhibit weakness in economic considerations and commercial insight.



Source: National Science Council

5. Basic Principles of Government R&D Budget Allocation

- **General principles of R&D budget allocation**
  - Adjustment based only on the previous fiscal-year budget
  - Could only apply the same budget adjustment percentage to all ministries
- **To propose a new significant issue or project**
  - The proposing ministry needs to squeeze financial resources from its existing budget to the support new proposal
  - The new proposal will not receive full financial support
- **R&D budget allocation for individual government ministries**
  - R&D budget stagnates
  - The already constrained R&D budget needs to support non-R&D issues as well

5.1 Case A: Developing Fundamental & Core Industrial Technologies Program

- **Vision:** Becoming one of the top 7 industrial countries within 10 years
- **Goal:** Controlling key technologies and increasing the added value of products
- **Resource Allocation:** Suggesting Executive Yuan give first priority and full-budget support
- **Upon Program Launch:** The entire program does not receive first priority and full budget support; only a handful of sub-programs obtain priority and financial support reassessment
- **Expected Outcome: It is certain that the entire program will not achieve its envisaged vision and goal**

5.2 Case B：In Response to the Impact of Trade Liberalization

- **Background：It is imperative to adopt trade liberalization policy**
- **Goal：To provide R&D funding to hardest hit industries in the liberalization process, i.e. local market-based and businesses low on the competitiveness scale**
- **Resource Allocation：Without specific budget allocation**
- **Upon Program Launch: "Squeezing" financial resources out of the R&D budget which was originally allocated to assist traditional industries to upgrade their technologies**
- **Expected Outcome：Neither the hardest hit industries (from trade liberalization) nor traditional industries will receive sufficient support to achieve the envisaged goals set by the government**

6. Problems Faced in Government R&D Budget Allocation

- The budget is not allocated by national priorities.
- The number of major national S&T issues/programs has risen significantly over the last few years.
- These significant S&T issues/programs are not receiving full budget support, and thus the planning cannot be implemented and the envisaged visions and goals will not be achieved.
- Many non-R&D, non-S&T issues (policies) are relying on already constrained R&D budgets, thereby eroding the resources of established R&D programs.

III. Connecting Technology and Innovation

1.The Importance of Innovation

- Technology is just one of the elements in the process of innovation and development of industry.
- Each stage of intellectual property creation, application, and commercialization should be considered according to its properties and integrated perspectives.

Target selection and planning
Strategic patent planning
Technology development
Systematic planning and practice
Experimentation
Standard setting
Managing patent portfolios
Service certification
Technology transfer

Identifying the market
Developing the product and service
Adapting to local markets
Educating customers
Pilot-run production
Distribution channels
Optimizing local laws and regulations
Mergers and acquisitions

2.1 The Case of Supporting Innovation: Accelerating Patent Examination Process(1)

- **Accelerating patent application backlogs to remove bottlenecks to creating intellectual property:**
  - **The Executive Yuan approved the "Accelerated Patent Screening Program" on July 24, 2010.**
    - **Due to a lack of office staff, the number of open application cases greatly outnumber closed cases over the last few years.**
    - **Non-examination tasks, such as patent searching services, decrease screening efficiency.**
  - **Solutions:**
    - **Lifting the human resource restrictions set forth in the Intellectual Property Office Organic Act and giving greater discretion to the IPO on staff-selection and hiring.**
    - **Establishing a new organization that is dedicated to carrying out patent searching services.**

2.1 The Case of Supporting Innovation: Accelerating Patent Examination Process(2)

- **Progress:**
  - **Amending the law in order to lift restrictions on staffing (the Act is currently under review in the Legislative Yuan).**
  - **Recommendation: Using the S&T budget to support the establishment of a patent search center.**
- **Expected Outcome:**
  - **The aforementioned recommendation will affect other S&T funding. The patent search center's establishment is an important project and therefore a specific and dedicated funding source should be secured for it.**

2.2.Case: Technology Commercialization Must Fit Customer Needs (1)

- New Technology: Requires interaction with customers and subsequent tweaking.
- Planning New Technology: How to commercialize it must be taken into consideration beforehand.
- Case Study: i236 Program (smart living technologies)
  - **Vision:** Developing 20 smart living technology applications and services in 2012, and promoting them among one million trial users.
  - **Action Plan:**
    1. Identifying gaps for smart living technology applications and services in the open market.
    2. Establishing an inter-ministerial task force to promote smart living technologies.

2.2.Case : Technology Commercialization Must Fit Customer Needs (2)

- **The Case: i236 Program (smart living technologies)**
  - **Upon Program Launch : Using Smart Town and i-Park to verify the commercialization of new technologies.**
  - **Expected Outcome: Successfully extending the scope of the Technology Development Programs (TDPs) increases the chances of success for the new technologies .**

3.Connecting Technology and Innovation

- **Connecting Technology and Innovation**
  - **Technology is just one of the elements in the process of innovation in industry.**
  - **Reviewing technology from multiple perspectives and discovering environmental gaps and bottlenecks.**
  - **Extending the scope of Technology Development Programs (TDPs) and increasing chances of success in technology commercialization.**
  - **Choosing specific targets in the market as starting points for resource and capability integration.**
  - **Inter-ministerial issues that need to be addressed including strengthening integration, division of labor, and coordination.**

IV. New Approaches in Resources Allocation beyond Government Restructuring

1. Important Issues for Science and Technology

- **Important Issues for Science and Technology**
  - **Setting Issues: Exercising prudence and applying focus.**
  - **Selecting Principles: Choosing the ones most beneficial to national development.**
  - **Execution Plans: Providing executive units complete budgets.**
  - **Allocating Resources across Ministries: Forming an inter-ministries platform to allocate resources according to the strategic importance of various national development policies.**

2.Connecting Technology and Innovation

- **About Connecting Technology and Innovation**
  - **Budget Planning:** Giving ministries reasonable flexibility to use research budgets.
  - **Division of Responsibility:** Sufficiently empowering ministries and requiring they take full responsibility.
  - **Performance of Ministries:** Building up a competitive mechanism for evaluating the performance of technology and innovation.
  - **Cooperation among Ministries:** Setting a coordination platform according to issues in order to ensure that goals are achieved.

V. Recommendations

- **The government should set up a dedicated inter-ministerial R&D budget coordination platform and make decisions based on the following principles:**

1. The existing R&D budgeting scheme cannot fully support the Executive Yuan's policy vision. We suggest that a top-down S&T policy planning approach should be adopted for efficient budget usage.
2. Budget Planning: Giving ministries greater flexibility and discretion in the use of R&D budgets.
3. Non-technological R&D Projects: Allocating separate funding sources for these projects.
4. For projects that individual ministries can accomplish singlehandedly: The government should give these ministries greater discretion and that the respective ministries take full responsibility in return.
5. For inter-ministerial projects: To customize a set of evaluation criteria (or platform) which can assess the progress of the entire project and the performance of each involved ministry.

The End
Thank You for Your Attention