



## 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

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# 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**



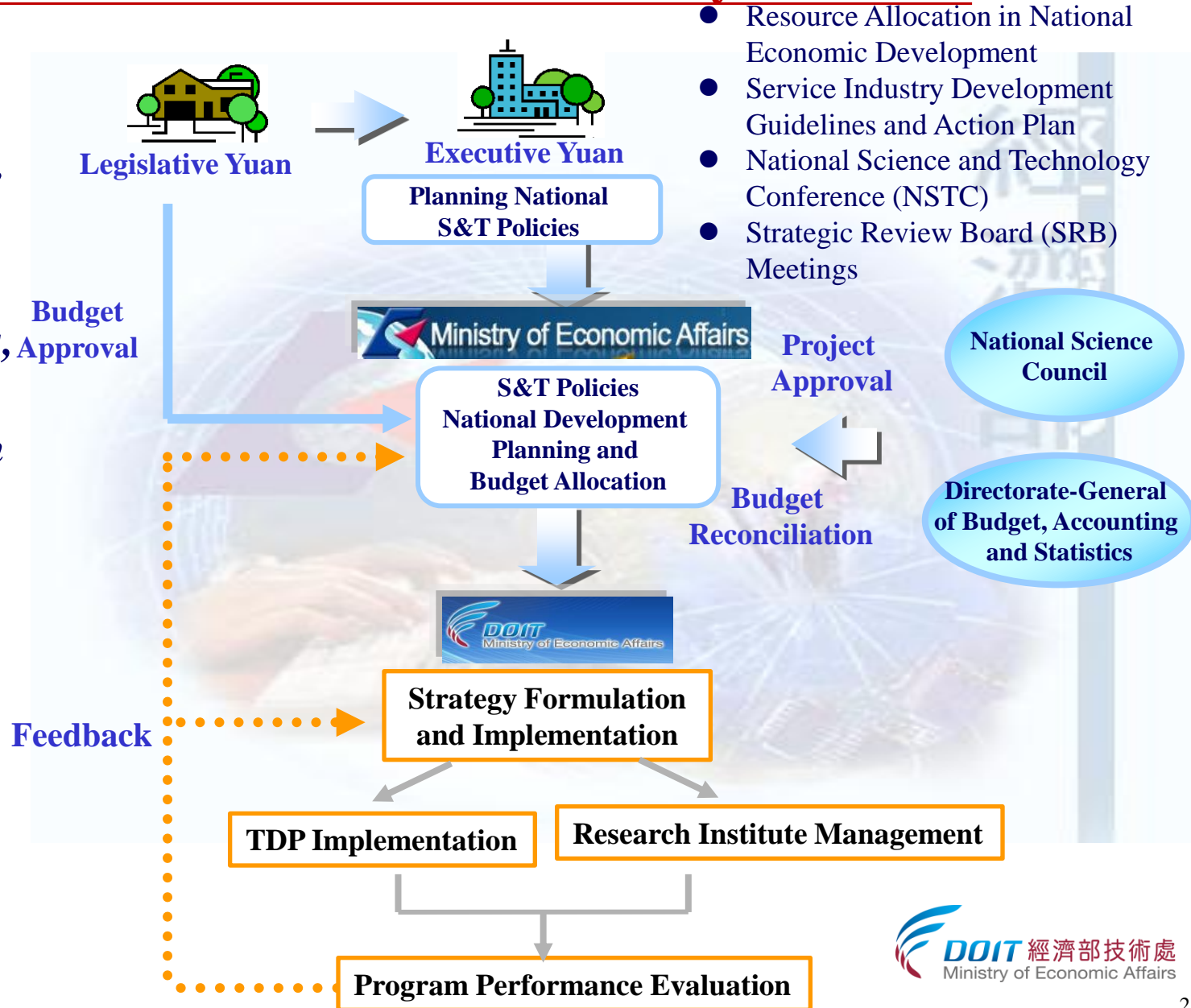
**Recommendations**



# 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

## 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

### Integrated S&T Policies and Resources

Low carbon & sustainable economy

Innovative economy and LOHAS Taiwan

Participating in the international economy & free trade

Industry transformation & exploring new opportunities

- ☑ 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

- **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

### 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

### 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



### Service Innovation

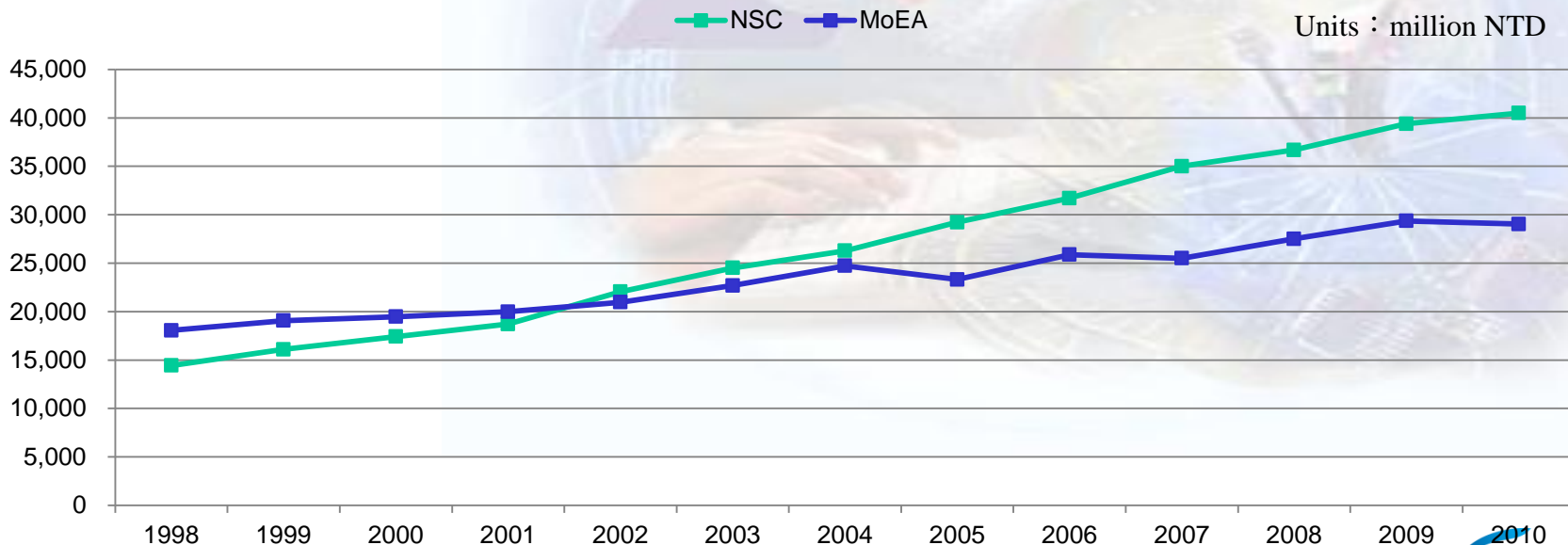
- Cloud computing systems and application service development project
- Service Ecosystem Research Value Engineering (SERVE) program

## 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**

### 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.



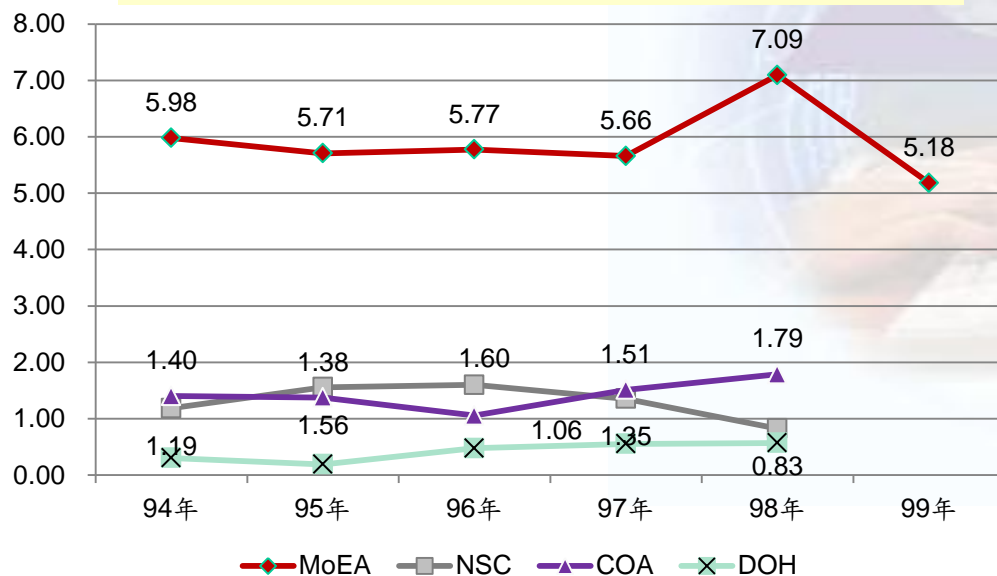




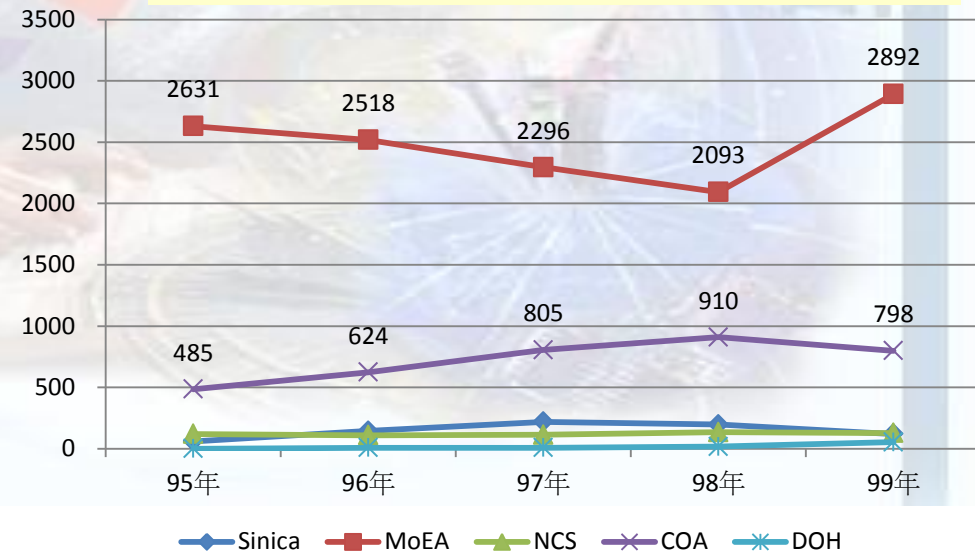
## 2. Performance of R&D Projects among Government Ministries

- 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)

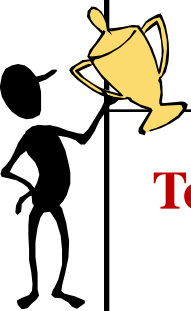




### 3. R&D Performance among Major International Research Institutes

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

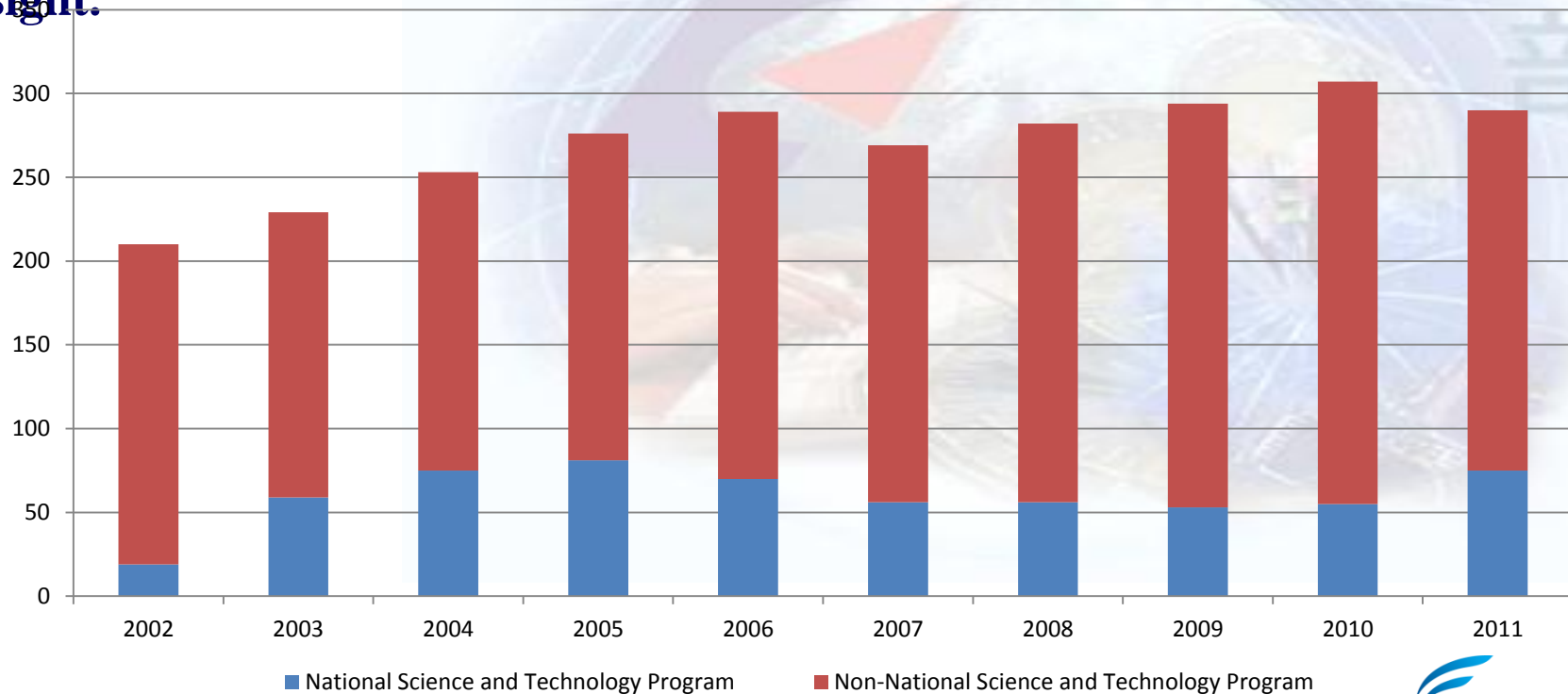
Research Institute	ITRI (TW)	SRI (US)	FhG (DE)	NRC (CA)	AIST (JP)	CSIRO (AU)	TNO (NL)
Global top 5% of most frequently cited patents	64	52	20	8	17	5	1
Global top 20% of most frequently cited patents	214	115	70	29	55	23	6
Total number of US patents	1,364	272	312	134	351	101	58





## 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.





## 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**