

Performance Evaluation of National R&D Programs in Korea

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Contents

- I. Introduction of National R&D in Korea**
- II. Necessity of Evaluation**
- III. Overview of R&D Program Evaluation**
- IV. Establishing National Evaluation System**
- V. Challenges and Responses : Evaluation in Change**
- VI. Concluding Remarks**

Introduction of National R&D in Korea

National R&D Expenditure in Korea (2006)

- ▶ **GDP : \$885bn**
- ▶ **Gross R&D Expenditure : \$28.6bn (3.23% of GDP)**

[R&D expenditure by the research entities]

Public Research Institutes	: 12.8%
Universities	: 10.0%
Companies	: 77.3%

[Source of fund for R&D expenditure]

Government / Public	: 24.3%
Private	: 75.4%
Foreign	: 0.3%

[R&D expenditure by the type of research]

Basic Research	: 15.2%
Applied Research	: 19.9%
Product Development	: 65.0%

[Tech. Employment Status]

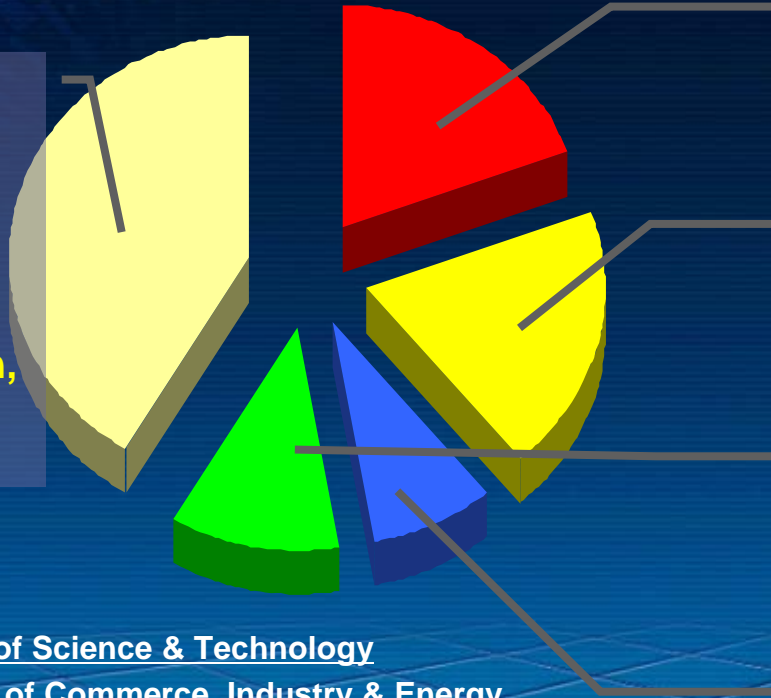
Total Tech. Employment	: 365,794
Researcher/Engineer	: 70.1%
Support Personnel	: 29.9%
Researcher per 1,000 labor force	: 8.3

(Source : MOST, 2007)

Government R&D Budget in Korea

Governmental R&D : \$ 7.7bn ('05)

Rest of Ministries
(Defense, Agriculture, Transportation, etc.)



MOCIE : 19% for Industrial Technology Development

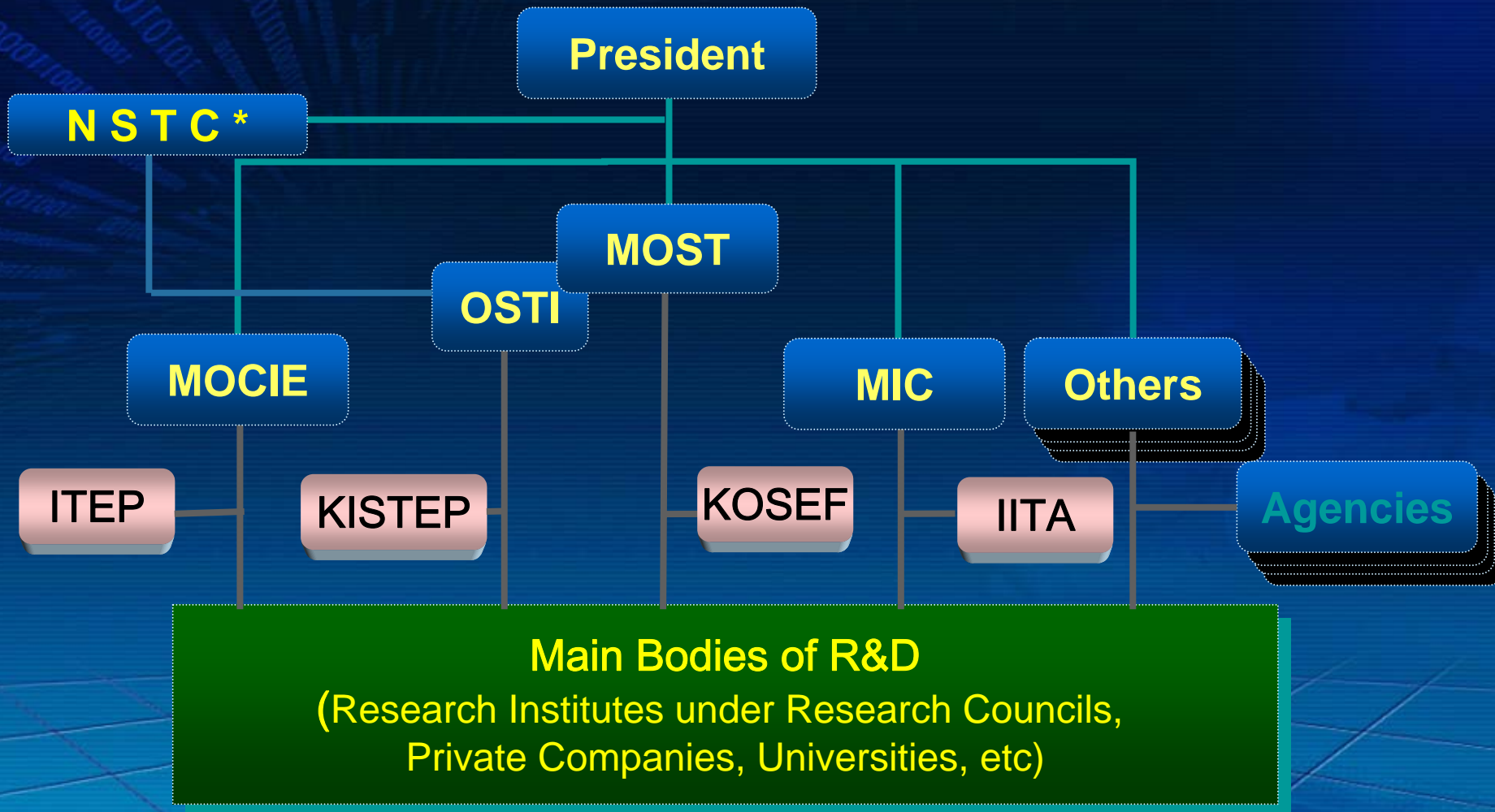
MOST : 19% for Scientific R&D

MOST(OСТИ) : 11% for GRIs

MIC : 9% for Information & Communication Technology

MOST : Ministry of Science & Technology
MOCIE : Ministry of Commerce, Industry & Energy
MIC : Ministry of Information & Communication
GRIs : Government supported Research Institutes

Structure of Public R&D System



*NSTC : National Science & Technology Council

Necessity of Evaluation

Necessity of Evaluation at National Level

- ▣ Overall S&T Competitiveness: 35th
- R&D Investment: 7th
- Research Manpower: 7th
- overseas Intellectual Property Rights: 3th
- Scientific Infrastructure: 19th
- Technological Infrastructure: 8th

*IMD World Competitiveness Report (2004)

- ▣ Increases and Diversity of R&D Investment

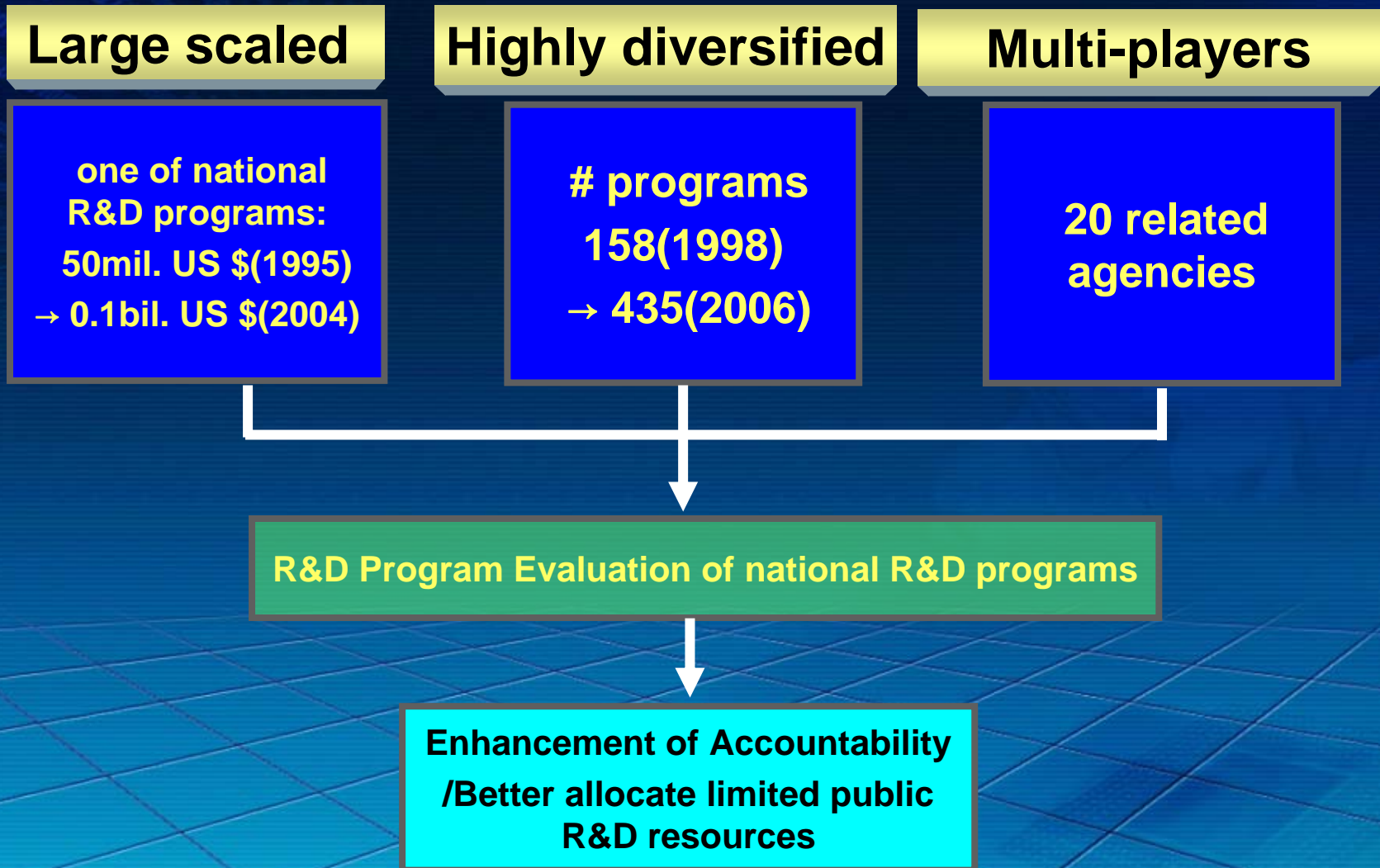
- FY 2005: 7.7 Billion US\$
- More than 400 Programs by 20 Departments(2005)

Increasing Attention on More Efficient and Effective Allocation & Use of the Government's R&D Budget

Need a New System for Evaluation of National R&D Programs

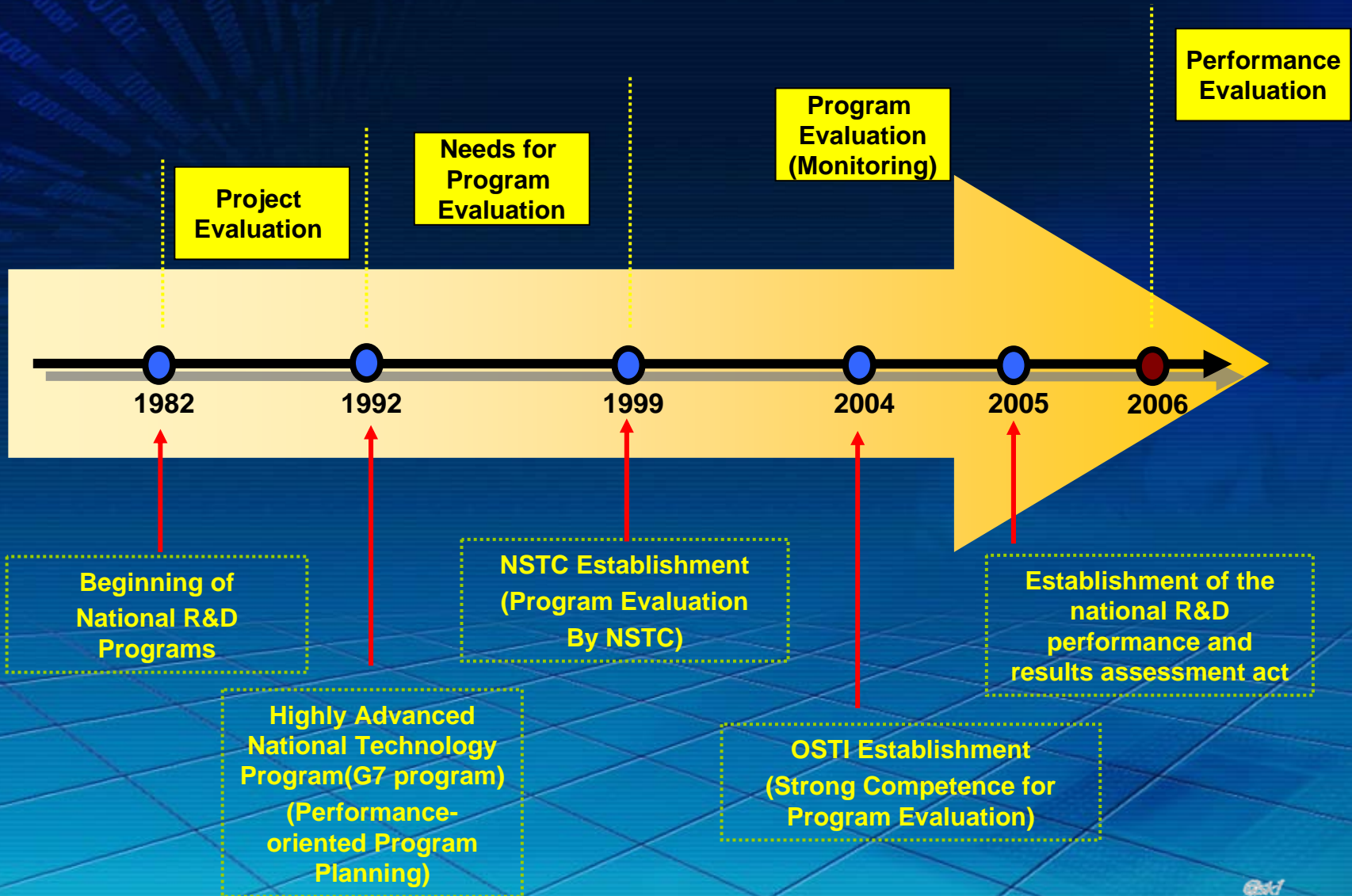
* National Science and Technology Council established on March 1999 has carried out the first analysis, evaluation and budget review on national R&D in 1999.

Necessity of Evaluation at National Level



Overview of R&D Program Evaluation in KOREA

Evolution of R&D Program Evaluation in Korea



Overview of National R&D Program Evaluation

❑ Launched in 1999 by NSTC

- To improve R&D programs
- For better allocation of public R&D resources
- To examine the role of government in the area of R&D

❑ Driving Forces of Evaluation

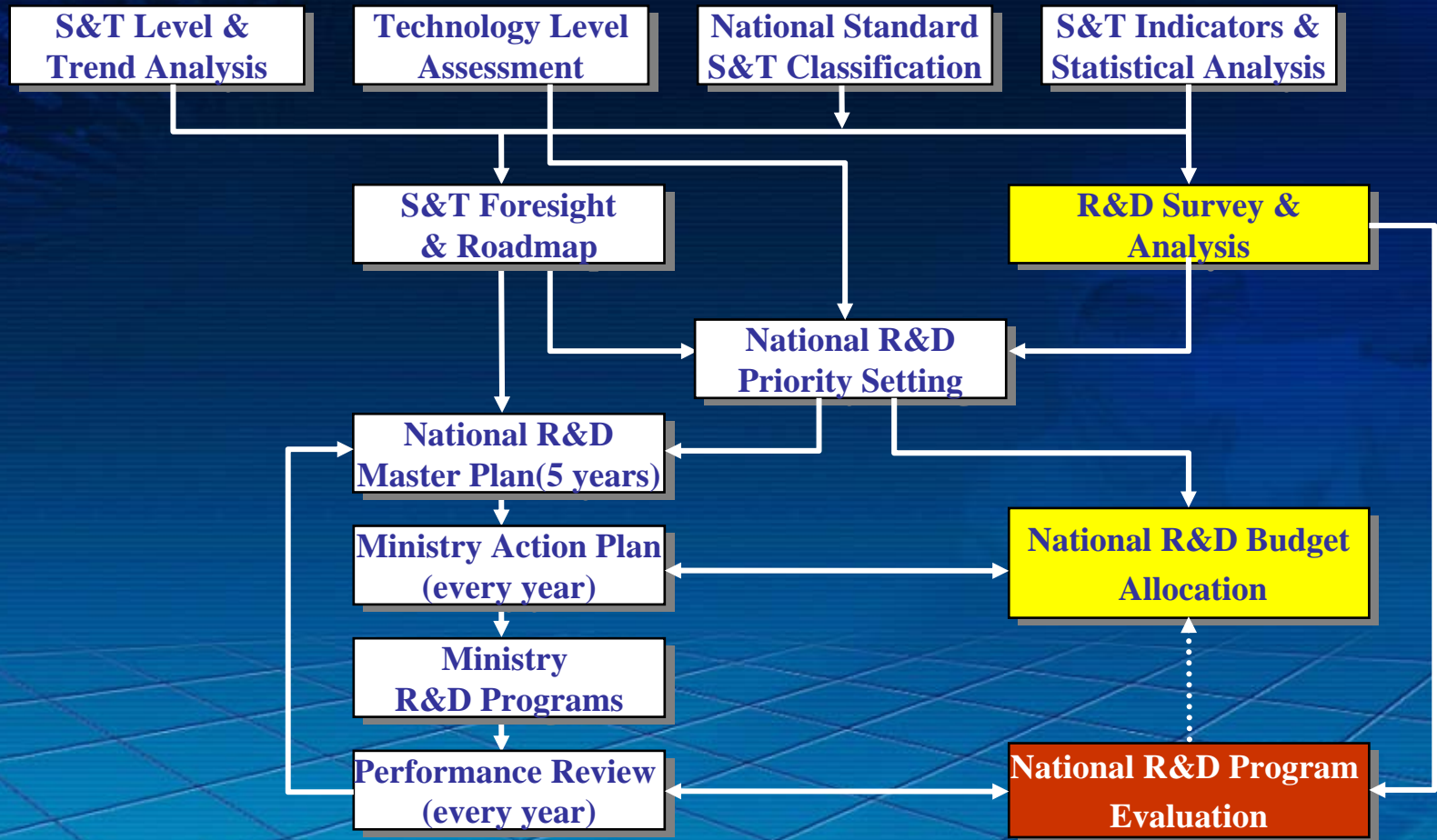
- Accountability to citizens
- To improve transparency of national R&D expenditure
- To enhance efficiency and effectiveness of R&D Programs

❑ Main Players

- NSTC (OSTI in MOST)
- KISTEP (supporting agency)
- R&D related Government Agencies

Program Evaluation in National S&T Activities

National S&T Planning



Overall Coordination for National R&D Programs

Objectives of National R&D Program Evaluation

To Improve R&D Programs

- To suggest the basic directions for program improvement
- To enhance the efficiency and effectiveness of programs

To Increase Accountability

- Accountability to citizens
- To improve transparency of national R&D expenditure

To Provide Useful Information for Decision-Making

- For better allocation of public R&D resources
- To examine the role of each program in the area of R&D

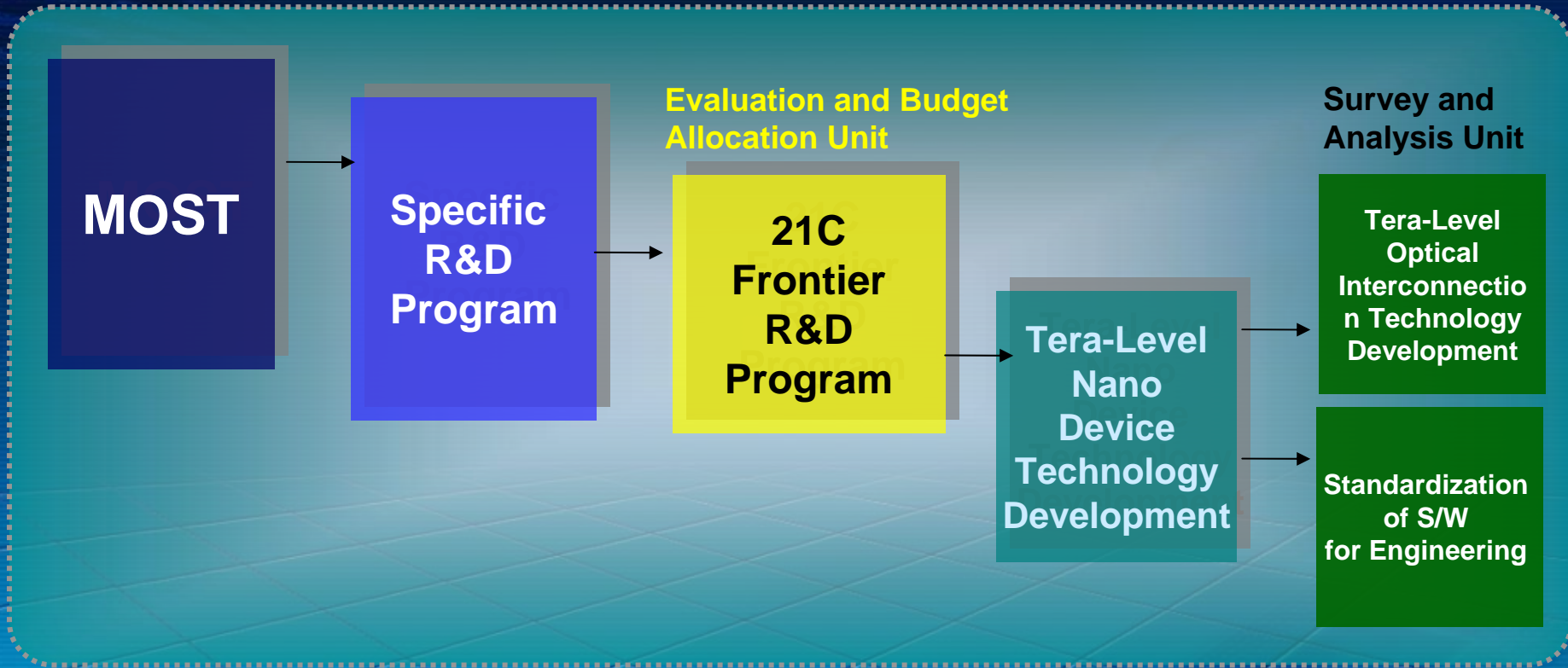
Evaluation Criteria

- **Validity of Program Contents**
- **Efficiency of Program Management**
- **Achievement during the Target Year**
- **Effectiveness of Program Results**

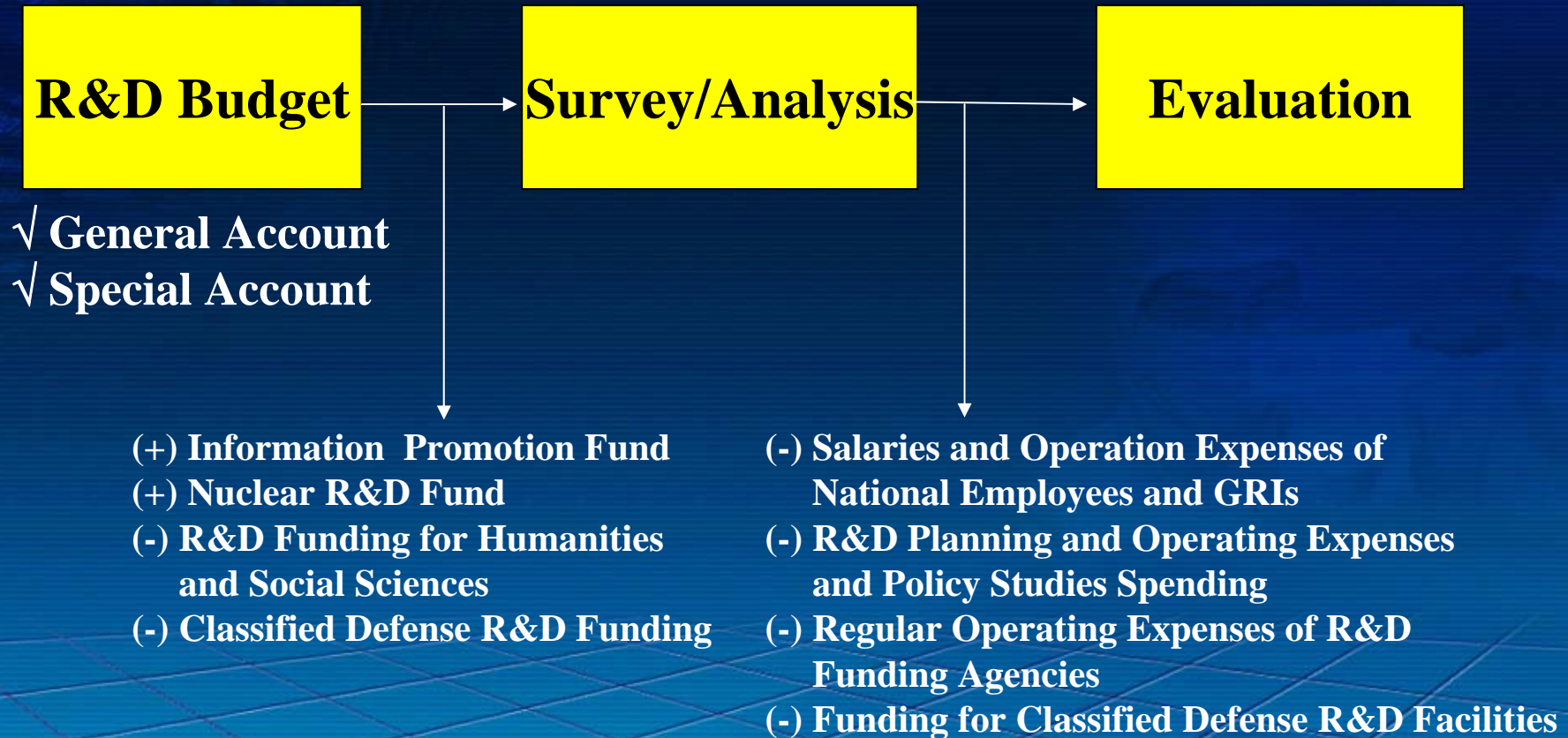
R&D Evaluation System in Korea

	Evaluator	Evaluation system	Evaluation methods
Research Program	NSTC	•Program evaluation	•Monitoring of annual results (ex-post) •Peer, qualitative, comparative evaluation
		•Budget coordination	•Ex-ante assessment of annual plans •Peer, qualitative, comparative evaluation
	Each ministry	•Internal evaluation of R&D programs	•Internal performance evaluation of R&D programs •Implemented every year/when necessary
Government Research Institute (GRI)	Research council & each ministry	•Institute evaluation	•Annual evaluation of management results and research activities •Peer and site evaluation
Research project	Each ministry & R&D management organizations	•Research project evaluation	•Peer evaluation of responsible projects •Evaluation of planning, progress, and results •Any time throughout the year
R&D Policy (issue)	NSTC	•Policy and issue evaluation	•Performance evaluation * in-depth BT evaluation (2003) •Implemented when necessary

R&D Evaluation Unit



Objects of National R&D Program Evaluation



Establishing National Evaluation System of Public R&D Programs

Background

- Demand for better performance and more effectiveness of R&D investment

※ R&D Budget: \$ 3.13 billion (1999) → \$ 8.25 billion (2006)

- Recent trend of performance evaluation and performance management systems both domestically and internationally

- U.S. : GPRA and PART → the performance evaluation on government programs (1993)
- Korea : MPB decided to introduce the performance management system (2003)
‘Framework Act on Government Program Evaluation’ (Mar. 2006)

* MPB : Ministry of Planning and Budget

Downside of the current R&D evaluation system

- The current R&D evaluation mostly focuses on the appropriateness of the budget input and execution process, thus lacking of objective monitoring and evaluation on the performance
- **R&D programs** : Since NSTC evaluates all the programs for a short period, substantial evaluation has been difficult, usually focusing on rating programs for budget allocation for the next year.
 - Complementing the evaluation results through a feedback is necessary, and more proactive monitoring and evaluation by a ministry in charge should be encouraged.
- **R&D projects** : Significance has been placed only for the selection and monitoring, thus lacking of objective criteria for evaluation in terms of performance
- **GRI (Government Research Institutes)** : Evaluation by the related ministries in the form of monitoring, thus performance has been low compared with input resources

Therefore, 『 the National R&D Performance and Results Assessment Act 』 was enacted transforming to the performance-based R&D Evaluation System

- Suggesting basic directions and future priorities to have consistency

Framework of National Evaluation System

2005.12

R&D Performance Evaluation Act

Before

● **direct evaluation of every program by NSTC**

● **Appropriateness on input and implementation process**

After

Role sharing between NSTC and ministry

Specific evaluation (NSTC)

- In-depth analysis and evaluation
- Provide detail improvement plan

Meta evaluation (NSTC)

Self evaluation (R&D ministry)

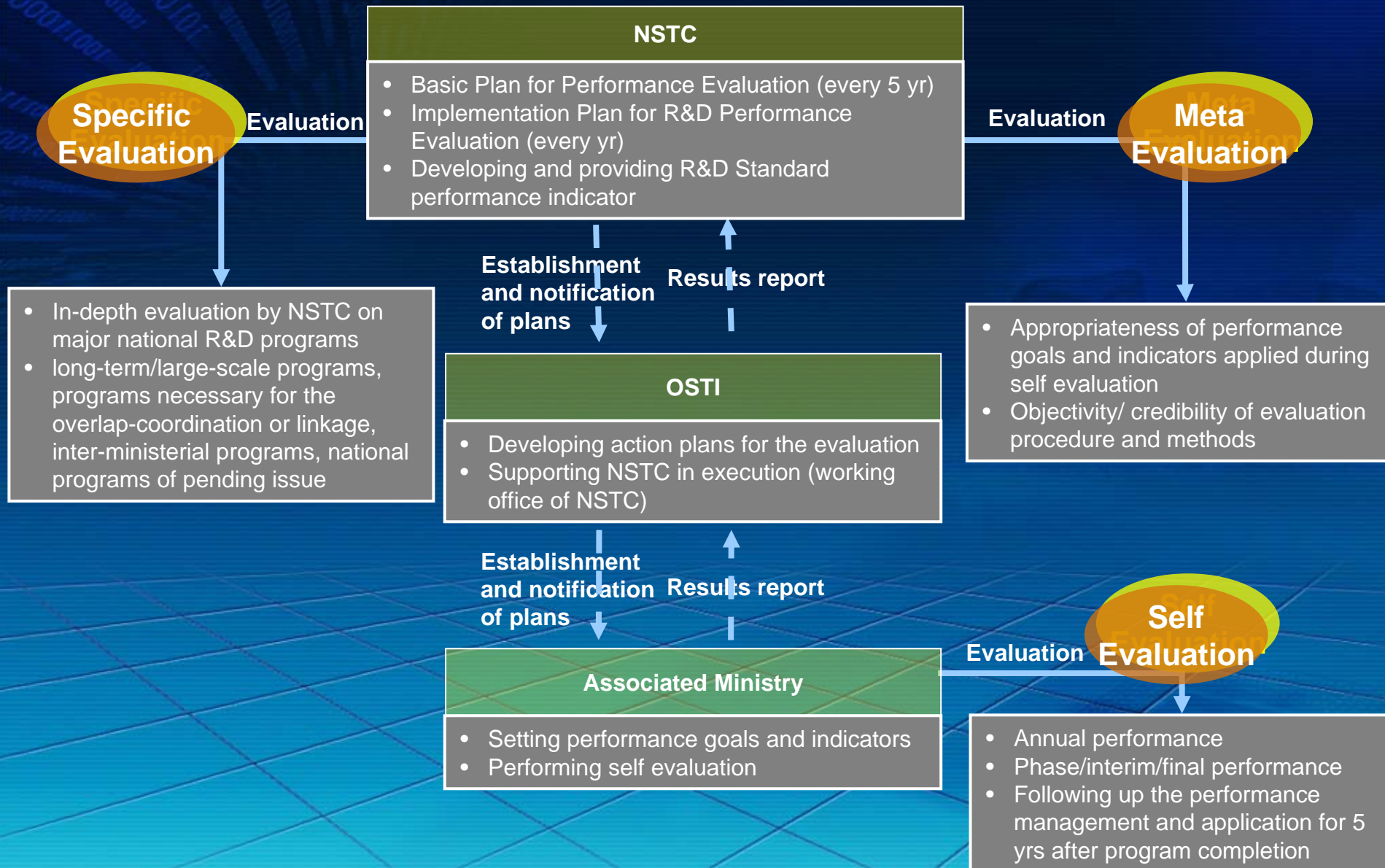
GRI evaluation (Research council)
Performance evaluation based on the mission

● **Performance evaluation based on the pre-set goal and indicators**

Evaluation System

Evaluation point

Framework of National Evaluation System



R&D Program Evaluation System

Specific
Evaluation

Long-term/large-scale program

Overlapped/correlated program

Multi-department related program

In-depth evaluation

Portfolio/Management

National pending issue related program

* Specific evaluation every 3 years (other programs are subject to self evaluation every year)

Self/Meta
Evaluation

Self
evaluation
(each ministry)

Meta
evaluation
(NSTC)

Re-evaluation
(Meta evaluation)

(if necessary)

(if necessary)

Re-evaluation
(Self evaluation)

Utilization of Evaluation Results

□ Specific Evaluation

Long term/Large Scale Program

- Program improvement (re-planning etc.)
- Resource Coordination (if necessary)

Overlapped /Correlated Program

- Inter-program coordination
- Transfer/Unification/Termination of program

Multi-departments Related Program

- Coordinating related programs
- Improvement of program management system

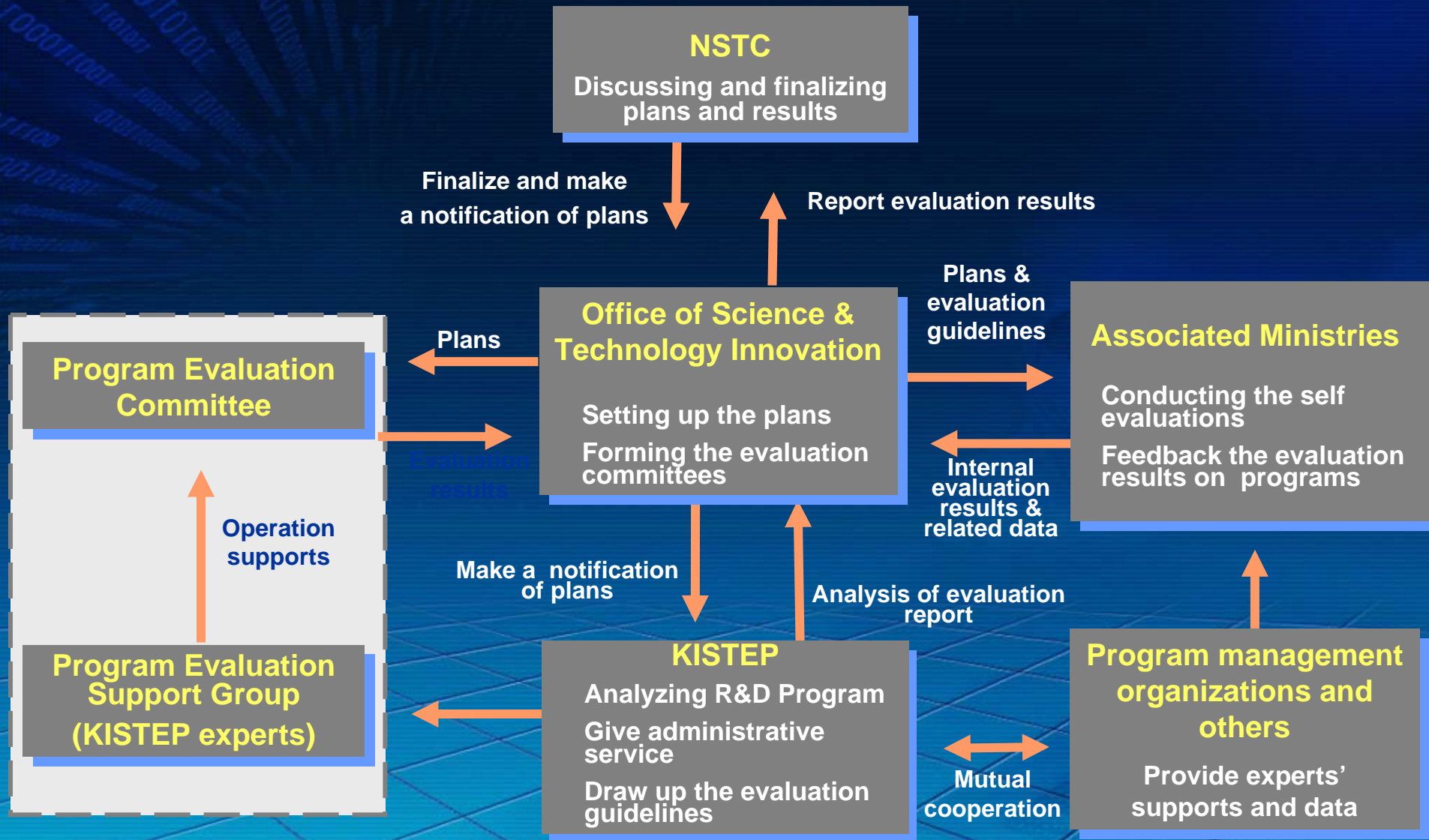
□ Self-Evaluation

- Program improvement, utilizing on budget allocation next year

□ Meta-Evaluation

- review on the appropriateness of Self-Evaluation (if necessary, re-evaluation)

Framework of Evaluation Implementation

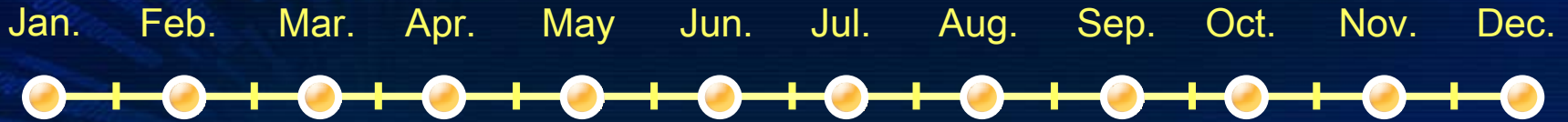


Specific Evaluation

In-depth performance evaluation on major R&D programs which NSTC conducts for program improvement and coordination

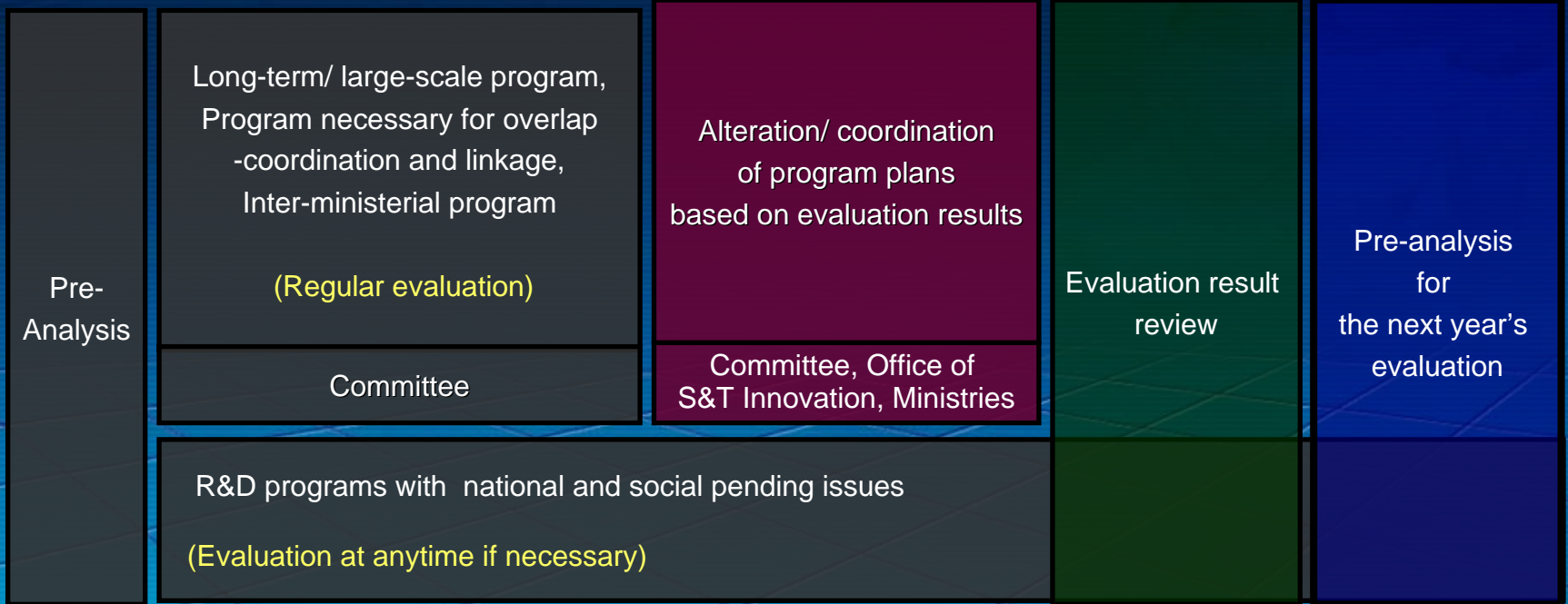
- Selection criteria for specific evaluation
 - Long-term / large scale program
 - Overlapped / correlated program
 - Multi-department related program
 - National socio-economic pending issue related program (if necessary)
- Sufficient analysis of the national R&D programs
 - Conducting comprehensive evaluation on the performance during the past 3-5 years
 - Future plans for the next 3-5 years
- Identifying parts necessary for coordination or improvement through in-depth and intensive evaluation, and suggesting concrete and proactive alternatives

Annual Schedule of Specific Evaluation



Interim evaluation result

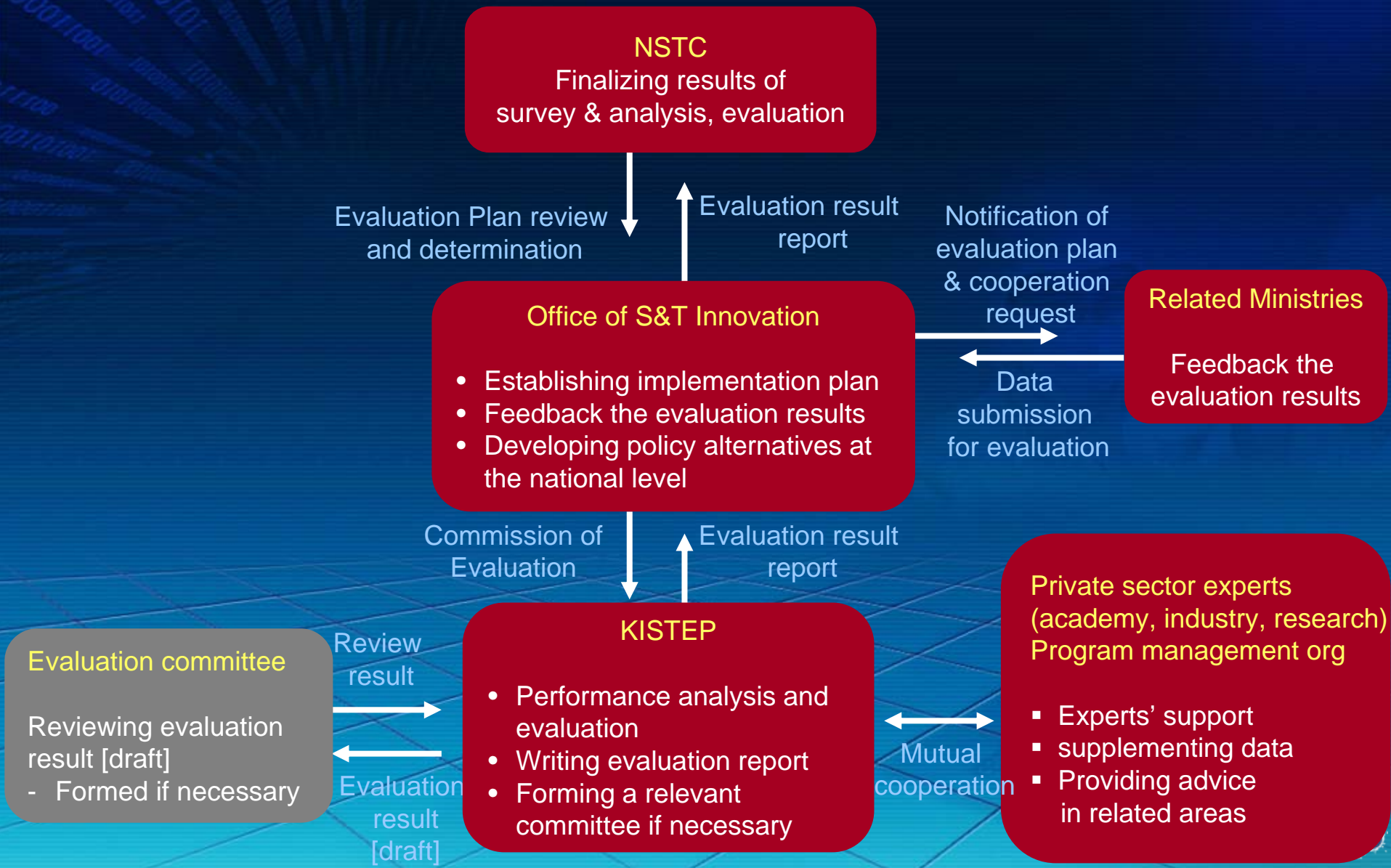
Final evaluation result



NSTC

NSTC

Implementation System of Specific Evaluation



Specific Evaluation Procedure

Step 1	Data Collection	<ul style="list-style-type: none">• Departments submit evaluation materials• collected through KORDI system
Step 2	Data Analysis	<ul style="list-style-type: none">• Program analysis: Positioning, Portfolio, Performance• performed by KISTEP experts
Step 3	Strategy Meeting	<ul style="list-style-type: none">• Evaluation Guideline is distributed• held by each committee
Step 4	First Panel Review	<ul style="list-style-type: none">• Review documented materials• Prepare questionnaire for the program details
Step 5	Program Explanation	<ul style="list-style-type: none">• Program manager present the details of program• O&A between panel and PM
Step 6	Second Panel Review	<ul style="list-style-type: none">• Panels re-investigate and evaluate all materials• Draw final conclusion
Step 7	Request for Reappraisal	<ul style="list-style-type: none">• Department is informed with the evaluation results• Departments may request for reappraisal
Step 8	Reporting	<ul style="list-style-type: none">• KISTEP members write the final report• Report the evaluation result to NSTC(OSTI)

Self Evaluation and Meta Evaluation

< Self Evaluation >

A performance evaluation by each ministry which measures the achievement of strategic goals and performance goals set by themselves

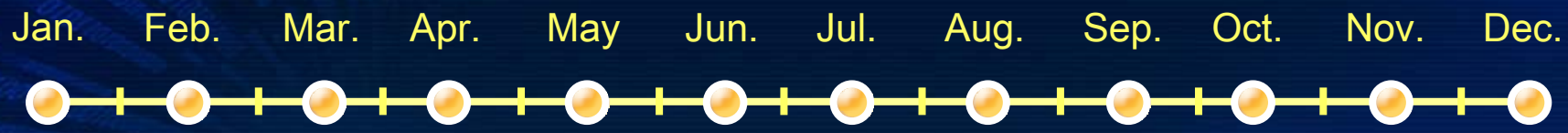
- ※ In the past, substantial evaluation was difficult and the evaluation has been focused on the rating since NSTC evaluated all the programs for a short period of time
- NSTC provides the guidelines for self evaluation and standard performance indicators
- Each ministry's setting strategic goals and performance goals by year and by phase and developing performance indicators reflecting program characteristics
- Ministries report self evaluation result to NSTC

< Meta Evaluation >

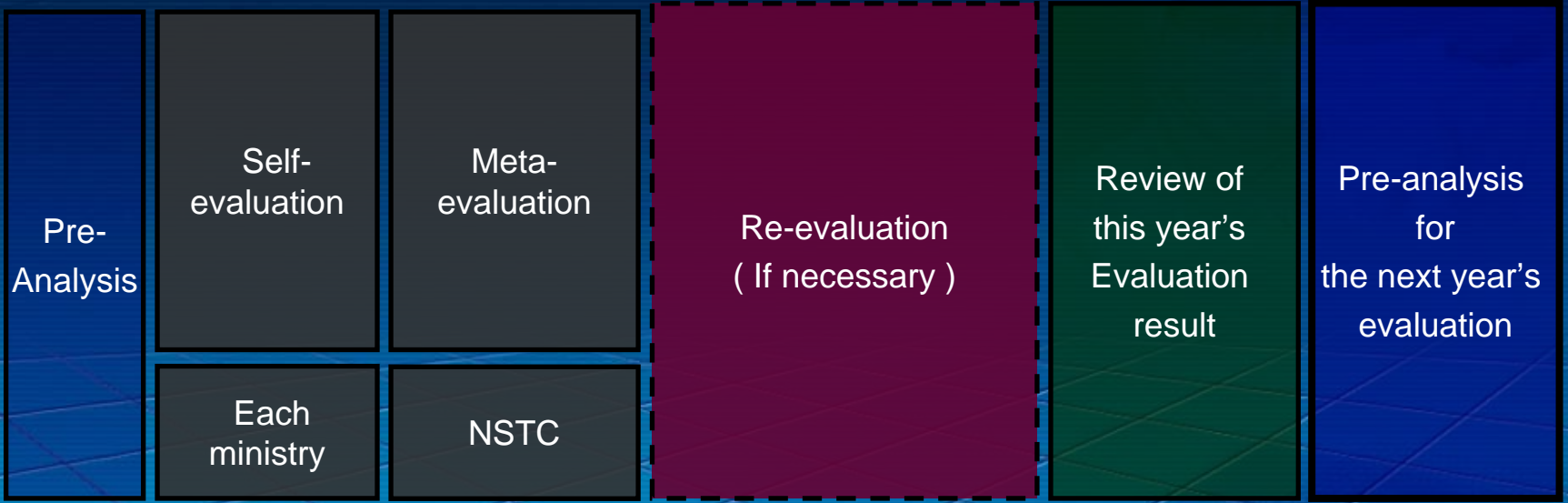
Evaluation by NSTC on processes and results of ministries' self evaluation

- NSTC conducts meta evaluation on the validity of self evaluation results
 - Appropriateness of performance goals and indicators set in self evaluation
 - Objectivity and credibility of procedures and methods of self evaluation

Annual Schedule of Self and Meta Evaluation

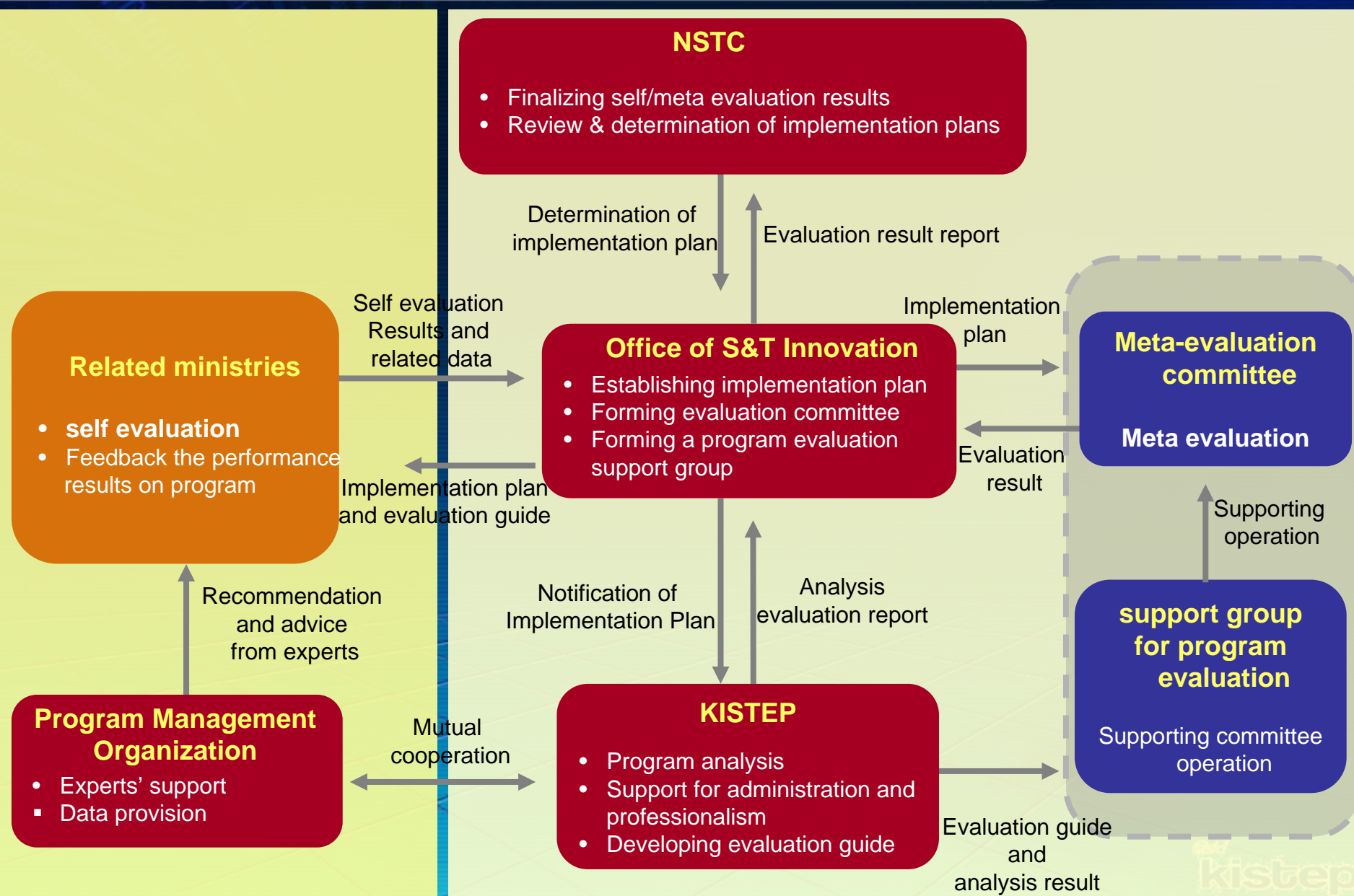


Interim Evaluation Result Final Evaluation Result



NSTC NSTC

Self Evaluation and Meta Evaluation Implementation System



Challenges and Responses : Evaluation in Change

Challenges

- **Limits in In-depth Evaluation**
- **Insufficient in Self-Evaluation Capabilities of the Ministries/Program Managers**
- **Not good in Performance-based Program Evaluation**
- **Insufficient in Evaluation Methodologies**

Responses

- To Build-up “National Evaluation System”
 - ☞ To Enhance the Nexus of Evaluation Systems
- To Promote Self-Evaluation Capabilities of the Ministries/Program Managers
- From Monitoring to In-depth Program Evaluation
- From Output-oriented to Performance-based Evaluation
- “R&D Performance Evaluation and Management Act”(2005)

Concluding Remarks

Results of R&D Program Evaluation by NSTC & OSTI

❖ **Very successful, until now**

- **strong control tower**

- **strong link with R&D budget**

- **competent supporting organization**

Some Issues in R&D Program Evaluation

- **Issue 1.** Scope of target programs
 - ✓ Every program? Optimal program level?
- **Issue 2.** Selection of evaluators
 - ✓ Experts from industry, university, research institute?
 - ✓ Basic/engineering/social science?
- **Issue 3.** Selection of Methodology
 - ✓ No perfect (or complete) evaluation methods
 - ✓ Each method has its advantages and drawbacks
 - ✓ Most of methods to be used complementarily

Concluding remarks

- Efficient and objective evaluation of national R&D programs must be a quite challenge
- National Evaluation System and experience of program evaluation at the national level in Korea will be good references
- But several points should be considered to enhance the effectiveness and efficiency of the R&D Programs
 - When to evaluate and how to utilize the evaluation results
 - Credibility of Self evaluation results
 - Feedback of the evaluation result on the next year's budget, etc

Thank you very much !