Effective Method to Evaluate the Impact of Projects; A New Approach Using the Logic Model to Ascertain the Paths Between R&D Output and Objectives

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Opinions expressed here are solely those of the authors.
1. Objective

2. Current METI R&D Evaluation Process

3. Scenario Writing Using the Logic Model

4. Conclusion
Objective: To develop a tool that assists in the evaluation of Impact upon a project

Tool:

Scenario writing using the Logic Model
Contents

1. Objectives
2. Current METI R&D Evaluation Process
3. Scenario Writing Using the Logic Model
4. Conclusion
## Current METI R&D Evaluation Process

### Ex-ante
- Self
- Prior Assessment

### Monitoring
- Interim Assessment
  - Sub-committee
  - Panel meeting

### Interim
- External

### Ex-post Assessment
- Ex-post
  - Sub-committee
  - Panel meeting

### Follow-up Assessment
- Follow-up
  - WG
  - Panel meeting

### Yearly Assessments
- 0 Year: Start
- 1st Year: Self
- Next Year: Ex-ante
- After 5 Years: Monitoring

### Assessment Methods
- Interview of key stakeholders
- Logic Model
- Indicator
- Score
- Peer Review
- Expert Review
- Quantitative (Bibliometrics)
- Interview/Questionnaire

### Evaluation Indicators
- ●● ●● ●● ●● ●
- ○○ ○ ○ ○ ○ ○ ○
I. Impact
  I-1. Technology Impact
  I-2. R&D Performance Improvement
  I-3. Economic Benefit
  I-4. Social / Life Improvement
  I-5. Feedback to Policy

II. “Hindsight” review
  II-1. Justification of project
  II-2. Target
  II-3. Planning
  II-4. Justification of ex-post evaluation based on results of II - 1 ~ II - 3
  II-5. Follow-up after project

Extent of progress

Evidence

Accelerating or Impeding Elements to Outcomes
Follow-up Evaluation for Impact Assessment

Ex-ante Evaluation
Interim Evaluation
Ex-post Evaluation

Follow-up Evaluation

The **Follow-up Evaluation** is the key evaluation for formulating subsequent policies and measures

→ Establishment of Follow-up Evaluation
1. Objectives

2. Current METI R&D Evaluation

3. Scenario Writing Using the Logic Model

4. Conclusion
Ministerial evaluation → Practical evaluation on specific issue

Constraints:
- Conventional budgeting
  Person in Ministry of Finance vs. Person in ministry on specific issue
- Limit of human resources
- 2 year rotation
Features of the Logic Model

- The model affords a view of the entire process, allowing the stages to follow an organized flow from the “Input” stage through to the expected goal.
- The model allows examination of the entire process, by both rational and logical views.
- The model offers a platform starting from the Input stage through to the expected goal; wherein, the R&D, promotion, and evaluation related members, as well as the customers, can provide input.
- In terms of planning, the concept can be passed on to the next generation.
- The model is designed to capture the progress and changes within the entire process.
- Ripple effects can be easily observed.

Resources (Input) ➔ Activities ➔ Output ➔ Customers Reached ➔ Short-term Outcomes ➔ Outcomes (through customers) ➔ Outcomes & Problem Solution

Context ➔ External Influences and Related Programs
Evaluation Range of a METI R&D Project

Output Evaluation → Evaluation of Impact to industry and Cost Benefits

Missing middle

R & D Project

Range of Project Responsibility

Outcome

Project Purpose

Policy Objectives

Key parts for impact assessment

Input (Funding, Duration, Organization)
Action (R&D, Management)
Output (Output, Indicators)
Customer
Direct Outcome
Logical Thinking

Develop a Logic Model using a Backcasting Approach

Develop Textbook for beginners of evaluation at METI
Logic Model Development Procedure

STEP Model Development from Project View

1. Create a clear project purpose using prior evaluation documents
2. Enter R&D project’s Input, activities and Output
3. Enter direct outcome attributes to each project output
4. Enter customer generated direct outcome
5. Draw rough outcome and linkage paths from the project’s direct outcome to the project purpose
6. Develop rough paths from projects purpose to program objective covering the projects
Logic Model Development Procedure

STEP 2 Linking Project Purpose with Program Objectives (precise linking not necessary at this step)

1. Create clear program objectives using existing documents
2. Find elements necessary to achieve program objectives in the ex-ante evaluation documents, etc.
3. Discriminate the finding elements generated by the project from elements that were generated by other projects
4. Draw rough outcomes and linkage paths from project’s direct outcomes to project purpose
This section is vital to understanding the entire process.

1. Again, check the program objective side & find elements necessary to achieve the objectives in the program ( "How" questions are effective for this purpose)
2. Find elements from the paths which connect project’s purpose with program objective
3. Develop effective elements and paths which connect project’s purpose with program objective
4. Sometimes you can find missing must-do projects to achieve program objectives
Procedure for Developing the Logic Model

STEP 4 Logic Model Development from Project View

① Discuss with stakeholders to verify and modify the logic model developed
② Delete the elements and paths which are not necessary to achieve program missions
③ Verify the modified logic model with stakeholders and make each element clear to the customers
④ Make the role of project output clear in the program and confirm they are adequately delivered to the customers
⑤ Check appropriateness of project’s output targets to achieve program objectives
Developed logic model; ASTER PALSAR Project

Commercial Off-The-Shelf (COTS) PALSAR equipment component development (ASTER Project)

- Developed logic model; ASTER PALSAR Project
- Developed & released the next-generation optical sensor
- Built new PALSAR & ASTER sensor
- WIP & SWIR bands
- Improved Stereo-Vision Technology
- Developed: APF (ASTER Project)
- Developed: ESDAC
- Developed: PALSAR (ASTER Project)
- Sensor
- Synthetic Aperture Radar (SAR)
- Project Goals
- Observation
- Enhanced Oil Resource Exploration
- Resource Identification
- Observation

Project Outcome

- Detailed Results
- Evaluation Documents
- Project Output
- Reduced Development Cost
- Reduced Project Duration
- Cost Savings

Impact of the Project

- Boost the development of new businesses
- Promote the development of new businesses
- New opportunities in the space industry
- Reduces the cost of satellite launches
- New business opportunities

Estimated Elements

- Paths developed from Project
- Off-Project Objectives
- Off-Project Alternative Objectives
- Off-Project Additional Objectives
- Off-Project Main Paths from Project
- Off-Project Objectives

Path from Project

- Development of novel technologies and systems
- Improved oil resource exploration
- Enhanced safety and environmental protection
- Increased economic growth
- Enhanced national security

[Diagram of Project Processes]
The Next Step

Collect evidence to clarify implicit elements & linkages
Conclusion

- Impact resides in the missing parts of R&D
- The Logic Model reveals those missing parts
- Backcasting assists in scenario writing
Thank you for your attention