Success factors analysis of NEDO project by interview survey

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NEDO
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Denver. USA
Purpose of the Study

Commercialized / practically applied

NEDO Project

Discontinued	Terminated

Research and technology development

Success factors analysis by follow-up monitoring

Feedback to the project management

Improve the possibility of Commercialized / practically applied

After the completion of the project
Purpose of the Study

Questionnaires ➔ Analysis ➔ Interviews

Reflected in the Questionnaire for the Following Year

“Quantitative Understanding” ➔ Close the Gap ➔ “Concept Formation”

Feedback to Project Management
NEDO Project Success Factors and the PDCA Cycle

Synergistic Effects of the Consortium

Involvement of NEDO and PL
- "Setting Creation"
- "Environment Building"
- "Incorporation of Users"

24 Cases → 105 Cases

Input

Plan

Do

Check

Act

Stop

Solving Problems is Impossible

Involvement of Users

Problem Extraction

Clarification of Targets

Output

PL; Project Leader
Re-Evaluation of the PDCA Cycle with Larger Sample Size

**Do**

- Synergistic Effects of the Consortium
- Collaborative and/or
  - Synergistic Effects of the Consortium

**Check**

- Involvement of Users
  - Involvement of Supply Chains and External Evaluation
Re-Evaluation of the PDCA Cycle with Larger Sample Size

NEDO and PL

“Incorporation of Users”

“Incorporation of Other Organizations”

“Good Reason”

Input

Others

“Passion and Crisis”

“External Conditions”

“Internal Conditions”
## New Classification

<table>
<thead>
<tr>
<th>Factor</th>
<th>Collaborative and/or Synergistic Effects of the Consortium</th>
<th>Involvement of Supply Chains and External Evaluation</th>
<th>Clarification of Targets and Solve Problems</th>
<th>Involvement of NEDO and PL “Incorporation of Other Organizations” “Good Reason”</th>
<th>Passion and Crisis</th>
<th>External Conditions</th>
<th>Internal Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Commercialized</strong>&lt;br&gt; ($n=49$)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>○: Positive</td>
<td>31</td>
<td>37</td>
<td>22</td>
<td>23</td>
<td>15</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>●: Negative</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>(#○–●)/$n$</td>
<td><strong>63.3%</strong></td>
<td><strong>75.5%</strong></td>
<td><strong>44.9%</strong></td>
<td><strong>46.9%</strong></td>
<td><strong>28.6%</strong></td>
<td><strong>12.2%</strong></td>
<td><strong>18.4%</strong></td>
</tr>
<tr>
<td><strong>Terminated</strong>&lt;br&gt; ($n=33$)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>○: Positive</td>
<td>13</td>
<td>9</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>●: Negative</td>
<td>3</td>
<td>6</td>
<td>15</td>
<td>2</td>
<td>1</td>
<td>14</td>
<td>2</td>
</tr>
<tr>
<td>(#○–●)/$n$</td>
<td><strong>30.3%</strong></td>
<td><strong>9.1%</strong></td>
<td><strong>-45.5%</strong></td>
<td><strong>3.0%</strong></td>
<td><strong>-3.0%</strong></td>
<td><strong>-42.4%</strong></td>
<td><strong>3.0%</strong></td>
</tr>
<tr>
<td><strong>Discontinued</strong>&lt;br&gt; ($n=23$)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>○: Positive</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>●: Negative</td>
<td>9</td>
<td>1</td>
<td>13</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>(#○–●)/$n$</td>
<td><strong>-26.1%</strong></td>
<td><strong>8.7%</strong></td>
<td><strong>-56.5%</strong></td>
<td><strong>-4.3%</strong></td>
<td><strong>-8.7%</strong></td>
<td><strong>-26.1%</strong></td>
<td><strong>-30.4%</strong></td>
</tr>
</tbody>
</table>
Primary Success Factors by Multiple Regression Analysis

First Factor
Check \(\rightarrow\) Act
Clarification of Targets and Solve Problems

Second Factor
Check \(\rightarrow\) NEDO and PL
Involvement of Supply Chains and External Evaluation
Primary Success Factors by Multiple Regression Analysis

Third Factor

Do

NEDO and PL

Collaborative and/or
Synergistic Effects of the Consortium

Fourth Factor

Input

Passion and Crisis
NEDO Project Success Factors and the New PDCA Cycle

Passion and Crisis Fourth Factor

External Conditions

Internal Conditions

Collaborative and/or Synergistic Effects of the Consortium Third Factor

Input

Plan

Build a System with Sorted Business Areas

First Factor

Solve Problems

Check

Clarification of Targets

Act

Problem Extraction

Solving Problems is Impossible

Involvement of NEDO and PL

"Setting Creation"
"Environment Building"
"Incorporation of Other Organizations"
"Good Reason"

Involvement of Supply Chains and External Evaluation

Output

Stop
Summary 1/3
~In order to obtain a Third Factor~

Start Up

1. Set up the research theme based on the understanding of changes in external conditions and the business environment.

2. Set up the research area that will serve as the common foundation while building a sorted system in which the companies’ business areas do not overlap.

3. Clarify and collectively share with the team the purposes and role assignments of the project.

4. Set up project rules such as IP rules at an early stage of the project.
Virtuous PDCA Cycle

5. By generating **Collaborative and/or synergistic effects** of the consortium, speed up the progress of R&D and create a **testable test product** at an early stage.

6. Implement evaluation of the test products with the **involvement of external evaluation** such as supply chains and public test institutes, and **provide feedback** of the test/evaluation results to the developers.

7. Turn the project into **an iterative process of improvement and evaluation** based on evaluation results.
Involvement of NEDO and PL

8. Instill a strong **passion and zeal** in the participants for commercializing their own R&D outcome.

9. To that end, NEDO and PL must **“create the project”** in the form of a consortium, **“build the environment”** for the consortium, such as preparing templates for protecting each organization’s intellectual property and rights to enable vigorous R&D activities, and, as needed, **“incorporate other organizations”** such as supply chains and public test institutes.
Thank you for your attention.
Summary

1. Set up the research theme based on the understanding of changes in external conditions and the business environment.
2. Set up the research area that will serve as the common foundation while building a sorted system in which the companies’ business areas do not overlap.
3. Clarify and collectively share with the team the purposes and role assignments of the project.
4. Set up project rules such as IP rules at an early stage of the project.
5. By generating collective and synergistic effects of the consortium, speed up the progress of R&D and create a testable test product at an early stage.
6. Implement evaluation (tests) of the test products with the involvement of external evaluation such as supply chains and public test institutes, and provide feedback of the test/evaluation results to the developers.
7. Turn the project into an iterative process of improvement and evaluation based on evaluation results.
8. Instill a strong passion and zeal in the participants for commercializing their own R&D outcome.
9. To that end, NEDO and PL must “create the project (setting)” in the form of a consortium, “build the environment” for the consortium, such as preparing templates for protecting each organization’s intellectual property and rights to enable vigorous R&D activities, and, as needed, “incorporate other organizations” such as supply chains and public test institutes.
### Relationship between Each Factor and Typical Comments from Interviews

<table>
<thead>
<tr>
<th>Related factor</th>
<th>Typical comments from the interviews</th>
</tr>
</thead>
</table>
| Collaborative and/or Synergistic Effects of the Consortium | 〇 We were given wisdom and advice, and obtained technologies and know-hows from other organizations.  
〇 The roles of each group were clear and we were each able to leverage our specialized knowledge and skills.  
〇 It prevented misinterpretations of the standard documentation by individual businesses and the technology level was enhanced.  
● Since we were conscious of each other when reporting at the report session attended by all businesses, we were not able to have deep discussions.  
● It seemed that each project member was aiming at different objectives. |
| Involvement of Supply Chains and External Evaluation | Collaborative and/or Synergistic Effects of the Consortium  
〇 We obtained information on not only the production process of our customer but also on other connections.  
〇 We were successful because we were provided materials from the upstream company.  
● Development would have progressed better if the samples were provided one by one in order. |
| | Clarification of Targets and Solve Problems  
〇 Users were narrowed down, and cost issues and needs were identified.  
〇 The outcome is the fruit of an iterative process of development and evaluation.  
● It was extremely difficult to meet the rising intricacy of user specifications.  
● It was extremely difficult to meet the demands of the users with intense cost-consciousness. |

〇: Positive factor  ●: Negative factor
# Relationship between Each Factor and Typical Comments from Interviews

<table>
<thead>
<tr>
<th>Related factor</th>
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<tbody>
<tr>
<td><strong>Passion</strong></td>
<td>• We had a strong will to commercialize the product no matter what.</td>
</tr>
<tr>
<td><strong>Crisis</strong></td>
<td>• We shared a sense of crisis that if we could not materialize XX, our product competitiveness would decrease.</td>
</tr>
<tr>
<td></td>
<td>• The development was terminated when the staff involved in the project who had strong motivation was transferred.</td>
</tr>
<tr>
<td><strong>External</strong></td>
<td>• We were watching the trend of technology enhancement speed. However, we had to change XX because competitors outdid us.</td>
</tr>
<tr>
<td><strong>Conditions</strong></td>
<td>• The technology was still costly in the mature market. However, a managerial decision was made to introduce this new technology from the understanding based on the global trend that otherwise the company’s share would rapidly decrease.</td>
</tr>
<tr>
<td></td>
<td>• We were able to develop the target technology but a foreign manufacturer had already developed the same technology.</td>
</tr>
<tr>
<td><strong>Internal</strong></td>
<td>• (We were successful) because of the top management support and understanding.</td>
</tr>
<tr>
<td><strong>Conditions</strong></td>
<td>• (We were successful) because the operation division got involved in the project.</td>
</tr>
<tr>
<td></td>
<td>• (The R&amp;D activities) were questioned by people of my business saying “the fact that R&amp;D on a next generation technology area that has not even been set up as an operation division is being implemented must mean that the next generation R&amp;D is taking place because the current generation development has been a failure.”</td>
</tr>
<tr>
<td></td>
<td>• Since we did not coordinate with the operation division, we found out later that our company’s strategies did not include the test items.</td>
</tr>
</tbody>
</table>

•: Positive factor  ●: Negative factor
### Relationship between Each Factor and Typical Comments from Interviews

<table>
<thead>
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</table>
| **Involvement of NEDO and PL**  
“Setting Creation”  
“Environment Building”  
“Incorporation of Other Organizations”  
“Good Reason”  
Others  
“External Conditions”  
Collaborative and/or Synergistic Effects of the Consortium  
Involvement of Supply Chains and External Evaluation  
Clarification of Targets and Solve Problems | ○(●) Appropriate specifications were identified by conducting technology surveys and customer needs surveys through the project. Without the existence of NEDO project, this product would not have been developed.  
○(●) Despite **not having a non-disclosure agreement**, the leadership of PL effectively enabled us to openly exchange information and provide technology.  
○(●) The PL and users were instrumental in forming the partnership among competitors which is normally an extremely difficult task to accomplish.  
○(●) **NEDO took the initiative** for the implementation of cross-industry collaborations and tests within other projects.  
○(●) Because of their involvement, **arrangements with related test institutes went smoothly** regarding the various tests required for commercialization. We are truly grateful for this.  
○(●) The actual data belong to another company. While **normally we would have not been able to obtain** such data, through this project, the data were provided to us to the extent possible.  
○(●) Most of our activities consisted of repeated trials to see if it operates with Windows and to contact Microsoft to ask if our corrective actions were appropriate or not. Since Windows is a complete black box, failures must be taken in and corrected by us. However, since the company was interested in this project, they provided us information on whether or not our corrective actions were appropriate. |

○: Positive factor  ●: Negative factor

**Negative factors were canceled out by the involvement of NEDO and PL**