Innovation Portfolio Management Process

GUIDEBOOK SUMMARY

Firm: Dow AgroSciences LLC
Industry: Chemicals, food ingredients, and biotechnology
Headquarters: Indianapolis, Indiana, United States
Geographic Footprint: Global
Ownership: Public—A wholly owned subsidiary of Dow Chemical
Revenue (2009): $4.5 billion USD

Problem:
Due to the size and scale of its innovation portfolio, Dow AgroSciences (DAS) finds it challenging to consistently assess project risks, compare projects, and measure portfolio value.

Solution:
Dow AgroSciences employs a portfolio management system that uses standardized project data to evaluate, manage, and compare projects individually and across the entire portfolio.

Business Results:
Dow AgroSciences surpassed its 2001–2010 Compound Annual Growth Rate (CAGR) goals by 8% by the end of 2008 and increased the percentage of realized expected value by 50%.

Resources Required:
- Full-time process leader and one half- or full-time administrator
- Network infrastructure commensurate with size and scale of the business
- Portfolio management consultant* and web-based software* system totalling:
  - $150–$300,000 USD start-up cost
  - $150–$500,000 annual operating costs

Applicability of Best Practice to Executive Functions:

<table>
<thead>
<tr>
<th>Function</th>
<th>Applicability</th>
</tr>
</thead>
<tbody>
<tr>
<td>R&amp;D/Innovation</td>
<td></td>
</tr>
<tr>
<td>Corporate Strategy</td>
<td></td>
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</tbody>
</table>

* Dow consulted with SmartOrg for its software solution.
The portfolio management process prioritizes, monitors, and evaluates the entire innovation portfolio

**The Portfolio Management Process**

1. **Use Strategy and Investment Criteria to Screen Projects**
   - **Objective:** Set strategy and investment needs for innovation projects.
   - **Key Participants**
     - **Portfolio Management Forum (PMF):** The executive team, comprised of the R&D leader and Global Business Line leaders, meets annually to evaluate the portfolio’s strategic fit and funding allocation.

2. **Establish Baseline Project Values**
   - **Objective:** Develop commercial assumptions for each project and enter them into the portfolio management system.
   - **Key Participants**
     - **Local Market Teams:** Cross-functional, local market teams enter information into the portfolio management system and perform tactical project work.
     - **Project Success Leaders:** These global project owners direct the activities of local market teams and cross-functional project core teams comprised of biology, regulatory, supply, and finance representatives. Project Success Leaders report to their respective Global Business Line Management Teams (see step 4).

3. **Eliminate Project Risks and Improve Value**
   - **Objective:** Identify the indicators with the greatest impact on project value and mitigate those uncertainties.

4. **Assess Project Progress**
   - **Objective:** Evaluate performance and strategic fit of individual projects and across business units.
   - **Key Participants**
     - **Global Business Line Management Teams (GBLMT):** The management team for each business unit (BU) sets innovation strategy and manages its product portfolio.

5. **Make Project and Portfolio Investment Decisions**
   - **Objective:** Perform annual project prioritization and funding allocation.
   - **Key Participants**
     - **Portfolio Management Forum (PMF)***

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**WHAT IS AN INNOVATION PROJECT?**

Dow AgroSciences (DAS) uses a web-based, integrated portfolio management system to track all innovation projects that qualify for funding. DAS’ innovation projects are either entirely new or extend an existing product line and can run multiple years. For the purposes of this guidebook we have simplified DAS’ multi-tiered innovation portfolio to the following three levels:

- **Projects**—a single innovation based on a specific technology for a specific purpose (e.g., a rice insecticide)
- **Product Line**—all projects (new innovations and line extensions) in the same product family (e.g., all rice insecticides)
- **Business Unit**—all product lines that fall under one of Dow’s market segments (e.g., pest management)
KEY TAKEAWAY: Establish strategy requirements and investment hurdles for innovations entering the portfolio

DAS’ Portfolio Management Forum (PMF) uses three screening criteria to determine whether a project should enter the portfolio management system and receive funding.

Qualifying for the Portfolio Management System

1. **Is the project in one of DAS’ strategic markets?**
   - The Market Attractiveness Matrix helps determine DAS’ ability to achieve a profitable long-term market position. The PMF updates the Matrix every two years to analyze its portfolio, identify attractive markets, and determine where to increase or decrease investments.

2. **What is the project’s life cycle stage?**
   - To ensure an optimal blend of new and mature products, the PMF gauges the life cycle stage of any new product under consideration.
   - Entirely new innovations are automatically classified as “invest” projects, while all other innovations are classified based on their life cycle stage and market’s attractiveness (per the Matrix).

3. **Does the project meet the minimum investment hurdles for its life cycle classification?**
   - PMF follows predetermined investment hurdles to determine innovation eligibility in the current budget cycle. The classification system removes the least strategic projects and gives insight to the expected value DAS should realize from its investments.

**Market Attractiveness Matrix (Illustrative)**

- **Product Line Life Cycle Stages**
  - **INVEST**
  - **GROW**
  - **DEFEND**
  - **MANAGE FOR CASH**
  - **RENEW**

**Classification and Hurdles**

- **Productivity Rate (NPV/ Cost)**
  - **INVEST**
  - **GROW**
  - **DEFEND**
  - **MANAGE FOR CASH**
  - **>5**
  - **>10**
  - **>15**
  - **>20**

- **IRR% (Internal Rate of Return)**
  - **>25%**
  - **>40%**
  - **>60%**
  - **>75%**

- **Payback Years**
  - **<10 years**
  - **<8 years**
  - **<6 years**
  - **<4 years**

**Project “X” Illustrative Example**

1. **Idea:** Project X is a rice insecticide line extension replacing an existing product in three years. Rice is a large but weak market for DAS, given its many competitors, low prices, and low margins.

2. **A rice line extension project falls into the “defend” product life cycle stage. However, given DAS’ weak competitive position in the rice market, the PMF downgrades it to “Manage for Cash.”**

3. **As a “Manage for Cash” investment, Project X meets the required investment hurdles—Productivity (22:1 per $ spent), IRR (76%), and Years to Payback (2 years)—and therefore enters the portfolio management process.**

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KEY TAKEAWAY: Create commercial market assumptions based off predetermined indicators of projects’ value

DAS identifies ten key indicators of a project’s value

**TEN INDICATORS OF PROJECT VALUE**

1. Price at maturity
2. Volume at maturity
3. Cost at maturity
4. Impact of cannibalization (by market and by new product)
5. Development costs for project
6. Capital investment required
7. Impact on maturity sales of technical failure
8. Shape of product life cycle
9. Incremental selling manpower
10. Promotion costs

**PREDICTING INNOVATION SUCCESS**

DAS evaluated 15 years of financial data to reduce 100+ data points used in innovation assessments to the 10 indicators listed above. These indicators ensure project teams focus on factors most likely to determine project success. Additionally, these ten indicators enable apples-to-apples comparisons across all projects.

**Generate Commercial Assumptions**

**Input Commercial Assumptions**

**Portfolio Management System**

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**Project X Homework Meeting**

- 1–2 hour discussion led by the Project Success Leader
- Cross-functional representatives from key areas of accountability: Commercial, Biology, Regulatory, Finance
- Discussion of factors influencing each indicator’s low- and high-value assumptions
- Document rationale for the range and revisit annually

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**Assumptions are estimates for each indicator based on market research and industry/market experience.**

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**Source:** Dow AgroSciences LLC; SmartOrg; Growth Team Membership™ research.
KEY TAKEAWAY: Evaluate assumptions to identify the indicators with the greatest impact on a project’s commercial value

The tornado diagram depicts the impact of uncertainty on the assumptions governing each of the ten key indicators; it calculates the NPV for each of its high, base, and low values; the longer the bar, the greater the uncertainty and its impact on project NPV.

Local Market Teams reduce “Volume at Maturity” uncertainty by strengthening their assumptions. They conduct a customer satisfaction and willingness-to-pay survey for the new product. Based on this information, the team can narrow its assumptions, thereby reducing uncertainty and improving project net present value (NPV).

Combined Uncertainty depicts the range of NPV values based on a statistical analysis of all the uncertainties. The longer the bar, the greater the team’s uncertainty about its assumptions, and the lower the expected value of the project.

Before Action (Illustrative)

After Action (Illustrative)

Uncertainty for Volume at Maturity
narrow from $4.1 M to $2.0 M NPV...

...The Combined Uncertainty decreases...

...and the expected project value improves from $3.3 M to $4.0 M.
**KEY TAKEAWAY:** Continuously assess individual project values to validate progress

*The Global Business Line Management Team uses project financial statements to monitor year-on-year performance...*

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**Project Financial Statement**

<table>
<thead>
<tr>
<th>Project</th>
<th>Baseline Submission</th>
<th>Current Submission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected Value (NPV—$ Millions)</td>
<td>4.34</td>
<td>6.11</td>
</tr>
<tr>
<td>Expected Cost (total costs $ millions)</td>
<td>0.34</td>
<td>0.43</td>
</tr>
<tr>
<td>Productivity (NPV/expected cost)—The greater the value, the greater the profit margin for the product</td>
<td>12.65</td>
<td>14.30</td>
</tr>
<tr>
<td>IRR (Internal Rate of Return—Yield of the investment)</td>
<td>0.73</td>
<td>1.01</td>
</tr>
</tbody>
</table>

Financials should improve as uncertainties are reduced and projects move to completion.

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**Project Value-Tracking Chart**

- **Project X**
  - Above annual target line
  - Performing better than its project plan
  - Change is positive; changes less than 10% are; not out of scope

- **Project Y**
  - Falls far below its annual target line and is performing beneath the minimum standard
  - Greater than 10% decrease in value
  - Requires in-depth project review

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**Global Business Line Management Team**

Global Business Line Management Teams evaluate project performance on three levels: project, product line, and portfolio. The GBLMT evaluates Global Project Success leaders’ progress in managing the value and uncertainties of their individual projects.

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**Source:** Dow AgroSciences LLC; SmartOrg; Growth Team Membership™ research.
KEY TAKEAWAY: Assess each business unit’s portfolio by value and risk to allocate further funding

Global Business Line Management Teams use the CFO charts, Commercial Uncertainty charts, and other considerations to conduct annual portfolio assessments and submit a prioritized project list to the Portfolio Management Forum.

1. Productivity Prioritization
   Projects are prioritized based on investment productivity, from most to least productive, and plotted in the CFO chart.

2. Risk Prioritization
   Project prioritizations are adjusted based on considerations such as risk versus return.

Interpreting the CFO Chart

High Productivity Projects (X, A, C) create the most value per unit cost.
- Project X has an NPV of ~$28 M, with costs of $200K, resulting in a productivity ratio of 140:1.

Marginal Projects (Y and F) are still productive projects, but may not stack up when compared across all business units.

Low Productivity Projects (D and Z) produce the least value per unit cost and are at risk of losing funding.

The Commercial Uncertainty chart complements the CFO chart by illustrating the risks associated with each project. Based off this analysis, teams can adjust projects’ prioritization in the funding queue.

Additional Assessment Tools

The portfolio management system allows DAS to easily assemble projects into portfolios and compare across all BU’s. The value and risk tools are the primary considerations along with:
- Market timing
- Probability of Technical Success chart
- Expected Project Value chart
- Cash Flow

Source: Dow AgroSciences LLC; SmartOrg; Growth Team Membership™ research.
**KEY TAKEAWAY:** Focus budget allocation on high-value, strategically aligned projects

*A two-pass funding process first funds high productivity, strategically aligned projects and then “the best of the rest”*

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**Two-Pass Annual Portfolio Funding Process**

1. **Hold Annual Funding Meeting**

   The Portfolio Management Forum (PMF) meets annually to evaluate the complete innovation portfolio and make cross-business unit funding decisions. The PMF compares the available budget to the requested funding and determines which projects to fund on the first pass.

2. **Fund the Best Projects**

   The PMF approves a predetermined percentage of the projects each business unit prioritizes as most valuable (represented by the green bars below).

3. **Fund the “Best of the Rest” Projects**

   Still-unfunded projects from all BU’s are pooled and compete for the remaining budget.

4. **Finalize Project List**

   Decisions are finalized and communicated to the business units within 48 hours of the meeting. The PMF also puts 10 projects on a waiting list for possible off-cycle funding. Should spending or viability of a funded project change resulting in a budget gain, the PMF selects the next feasible project.

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**Illustrative**

<table>
<thead>
<tr>
<th>Project</th>
<th>BU</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZZ</td>
<td>Rice</td>
<td>$2 M</td>
</tr>
<tr>
<td>Z</td>
<td>Small Grains</td>
<td>$2 M</td>
</tr>
<tr>
<td>Q</td>
<td>Insect Control</td>
<td>$3.5 M</td>
</tr>
<tr>
<td>AA</td>
<td>Corn Herbicides</td>
<td>$2.5 M</td>
</tr>
<tr>
<td>B</td>
<td>Pest Mgmt.</td>
<td>$2.5M</td>
</tr>
<tr>
<td>K</td>
<td>Small Grains</td>
<td>$2.5 M</td>
</tr>
<tr>
<td>L</td>
<td>Corn Herbicides</td>
<td>$15 M</td>
</tr>
<tr>
<td>AD</td>
<td>Turf</td>
<td></td>
</tr>
</tbody>
</table>

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The PMF determines it will fund 80% ($160M) of the project requests. This “first pass” quickly turns the funding conversation to the projects on the margin. In doing so, the PMF can examine these projects more closely and make decisions to maximize value.

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From: The PMF
To: Business Unit
Subject: Alternates

Approved Projects:
- Project X
- Project A
- Project C
- Project Y

Rejected Projects:
- Project F
- Project D
- Project Z
Business Results

*Dow AgroSciences has increased project management efficiency and value capture...*

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**Improved Project Success**

- The portfolio management system enables Project Success Leaders to make accurate forecasts and increase captured value from each project.

**Average % Captured of Forecasted Sales and Margin**

- **Pre-Portfolio Management System**: 
  - Sales: 20%
  - Margin: 50%

- **Post-Portfolio Management System**: 
  - Sales: 50%
  - Margin: 100%

...leading to greater sustained value in its portfolio over time, as well as the attainment of its growth goals.

**Sales CAGR**

- **CAGR Goal 2001–2010**: 5%
- **CAGR Actual 2001–2007**: 2.5%

**EBIT* CAGR**

- **CAGR Goal 2001–2010**: 20%
- **CAGR Actual 2001–2007**: 15%

*Non-GAAP financial measure; excludes certain items.*

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Source: Dow AgroSciences LLC; SmartOrg; Growth Team Membership™ research.
Key Lessons Learned

Profiled Company Perspective

• Successfully combining portfolio and project management requires the right balance of people, process, and systems. The appropriate balance depends on your situation, but over or under resourcing any one of these areas tends to undermine the success of the others.

• Data modeling is an effective way to reduce effort and save time without a corresponding loss in information. Less can be more when you avoid focus on a single, “perfect” number.
  - Allowing users to reflect uncertainty in their inputs generates more realistic values and data ownership. The inputs also show project teams where they should try to reduce project uncertainty and improve project value.

• A system that is transparent to all stakeholders provides tremendous benefits.
  - Clear project metrics provide team members immediate feedback on their projects. Paired with investment guidelines, teams gain a frame of reference for the difference between marginal and acceptable projects.
  - A straightforward project approval process and clear prioritization criteria build trust for the process among stakeholders. Consensus on which projects should be funded, rejected, or discontinued is much easier to achieve when everyone is referencing the same information.

• Strategy should be set at a corporate (i.e., global) level, and local market teams should own execution. That said, the global team should not handle decision-making for local market projects. Local teams’ appreciation for region-specific nuances is critical to accurately predicting how a project might sell within a given market.

• Not all portfolio management technology solutions are created equal. Finding the right software designed for the task is important. Dow AgroSciences was looking for tools to aid in portfolio and project management; tracking project value, identifying uncertainties, and presenting alternatives through quantitative modeling. Dow chose Portfolio Navigator by SmartOrg because of this.

Source: Dow AgroSciences LLC; SmartOrg; Growth Team Membership™ research.
## Supporting Tools & Resources

### Example: Project Financial Statement

**Illustrative**

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<td>1.01</td>
</tr>
<tr>
<td>Years to PayBack (# of years)</td>
<td>3.7</td>
<td>3.1</td>
</tr>
<tr>
<td>Cost Budget 2010 (Annual $ spent —millions)</td>
<td>0.06</td>
<td>0.21</td>
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<tr>
<td>Cost Budget 2011</td>
<td>0.01</td>
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</tr>
<tr>
<td>Cost Budget 2012</td>
<td>0.00</td>
<td>0.14</td>
</tr>
<tr>
<td>Average Products</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Number of Products</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Expected Products Values</td>
<td>2.17</td>
<td>3.05</td>
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<tr>
<td>Expected Commercial Value Given Technical Success</td>
<td>3.91</td>
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<tr>
<td>Probability of Technical Success</td>
<td>0.60</td>
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<td>Expected Products Cost</td>
<td>0.17</td>
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<tr>
<td>Cost Budget 2010</td>
<td>0.03</td>
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</tr>
<tr>
<td>Cost Budget 2012</td>
<td>0.00</td>
<td>0.07</td>
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</tbody>
</table>
Supporting Tools & Resources

SmartOrg Inc.

SmartOrg, Inc. is a leading provider of decision support software that optimizes project/portfolio economic value—from concept to commercialization. Customers include Boeing Commercial Airplanes, Chevron Technology Company, Dow AgroSciences, Bayer CropScience, Hewlett-Packard and like companies in the U.S. and Europe. The flagship application, Portfolio Navigator™, is installed on company servers or hosted by SmartOrg. The system stands alone or is integrated with resource management applications such as SAP PPM.

For additional information, please visit [www.smartorg.com](http://www.smartorg.com) or send email to [info@smartorg.com](mailto:info@smartorg.com)