MEASURING THE VALUE OF R&D IN INDUSTRY

Charles P. Larson
Executive Director
Industrial Research Institute, Inc.
http://www.iriinc.org

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TECHNIQUES FOR IMPROVING THE INNOVATION PROCESS
- Competitive Intelligence
- Stimulate Creativity and Idea Generation
- Enhance Intellectual Capital
- Integrate Technology Planning with Business Strategy
- Evaluate R&D Portfolios
- “Change the Rules of the Game” through Discontinuous Innovation
- Measure Effectiveness with Metrics

BUSINESS AND TECHNICAL INTELLIGENCE
- Company vision depends on current and potential competencies
- R&D leaders must continuously assess competencies of scientists and engineers and the stock of intellectual property
- Important to protect this intellectual property

BUSINESS AND TECHNICAL INTELLIGENCE (cont’d)
- Must also provide continuous upgrading of skills and knowledge
- Supplement internal assessment by an evaluation of the current competencies of one’s competitors, suppliers, and customers
- These assessments provide competitive intelligence that is beneficial when new lines of business are being considered

OVERVIEW
- Current focus of industry is to manage for growth
- Growth is driven by innovation
- Various techniques for improving the innovation process
- IRI/CIMS R&D Database
- IRI Technology Value Program

BUSINESS AND TECHNICAL INTELLIGENCE
- 3000 Raw Ideas (unwritten)
- 300 Ideas Submitted
- 125 Small Projects
- 9 Large Devel.
- 4 Major Devel.
- 1.7 Launches
- 1 Success

“Universal” Industrial Success Curve for Substantially New Products

INTEGRATION OF TECHNOLOGY PLANNING (R&D PORTFOLIO DEVELOPMENT) WITH BUSINESS STRATEGY

- Strategic planning is conducted at the business-unit level as well as the corporate level.
- Challenge for technical leaders is to be effectively involved in the planning process at both levels.
- Requires credibility as well as leadership.
- Technology planning must be integrated with both the long-range vision as well as the short-term plans of business units.

INTEGRATION OF TECHNOLOGY PLANNING (R&D PORTFOLIO DEVELOPMENT) WITH BUSINESS STRATEGY (cont'd)

- Process involves teamwork—cross-functional teams that work together to create "seamless innovation" process.
- Organizational structure of the technical function can have a significant impact on a firm's capacity for innovation.
- A sophisticated information system is a critical element in innovation processes.

R&D PORTFOLIO EVALUATION

- Ensure that projects support either the short- or long-term strategy of a business unit or the corporation.
- Align focus, risk level, investment requirements, sales/profit potential, capital availability, production capability, etc. with these strategies.
- Strategic approaches found more effective than financial models.

EVALUATION OF R&D USING OPTIONS THINKING

- Approach brings a new view of uncertainty versus NPV from DCF.
- More uncertainty, thus more opportunity for value creation.
- Helps identify potential for future gain rather than risk of loss.
- DCF focuses on most likely outcome sequence.
- Options thinking encourages adaptive course adjustment that can demonstrate substantial value.

DISCONTINUOUS INNOVATION

- Intent is to change the rules of the game.
- Current equivalent of skunk works being used.
- Time for independent research allowed by many companies.
- Usual management practices can stifle radical thinking and approaches.

DISCONTINUOUS INNOVATION SUCCESS KEYS

- Clearly articulate strategic intent to persons at all levels.
- Establish virtually unreachable goals.
- Deliberately target rich domains.
- Rotate people between R&D and business units.
- Expose people to the marketplace.
**METRICS TO ASSESS R&D EFFECTIVENESS**

- Major barrier to effective use is collection of data required for input
- ROR Committee initiated industrial R&D database project with CIMS in 1993
- Data on R&D inputs and outputs collected at the firm, laboratory and business-segment level
- Also developed a "Technology Value Program" (TVP) to measure effectiveness of innovation process

**METRICS TO ASSESS R&D EFFECTIVENESS (cont’d)**

- Metrics included percentages of new sales and cost savings from products or processes introduced in the previous 3 to 5 years
- Projected value of the R&D pipeline
- Rating of product-technology benefits
- Efficiency of internal technical processes
- Project championship
- Management support

*TVP is available as a software package and can be correlated with IRI/CIMS database.

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**MEMBERS CHOICE METRICS**

**IRI SURVEY RANKING**

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<thead>
<tr>
<th>Rank</th>
<th>Metric</th>
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<tr>
<td>11.5</td>
<td>Strategic Alignment</td>
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<td>Financial Return</td>
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<td>Projected Value of the R&amp;D Pipeline</td>
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<td>Distribution of Technology Investment</td>
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<td>Use of Project Milestones</td>
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<td>5.5</td>
<td>Development Cycle Time</td>
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<td>Customer Satisfaction</td>
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<td>5</td>
<td>Number of Ways Technology is Exploited</td>
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<td>Number of Projects Having Bus/Mkt. Approval</td>
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<td>Goal Clarity</td>
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<td>Use of Cross-Functional Teams</td>
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<td>Quality of Technical Team</td>
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NS = Not Surveyed
Red = Benchmarked in CIMS Survey