OVERVIEW
Timken R&D surfaces and validates the assumptions underlying business goals and tradeoffs, enabling project teams to focus their efforts on validated business priorities and explain the way in which technologies support business objectives.

SOLUTION HIGHLIGHTS
- **Assumptions Validation Map**: Facilitates understanding of the assumptions underlying the business’ vision and their implications for the business’ future priorities and decisions.
- **Enterprise-wide Assumptions Valuation**: Reveals the company’s top priorities and where R&D should– and should not– focus its efforts.
- **Integrated Impact Technology Roadmap**: Directly connects R&D strategy to business goals, enabling R&D and the business unit (BU) to speak a common language.

COMPANY SNAPSHOT
The Timken Company

- **Industry**: Industrial Manufacturing
- **2012 Sales**: US$5 Billion

The Timken Company is a global industrial technology leader, with a deep knowledge of metallurgy, friction management and power transmission. The company engineers, manufactures and markets mechanical components and high-performance steel supporting diversified markets worldwide.
EXECUTING WITH INCOMPLETE INFORMATION

The Challenge: Timken R&D Pipeline
Circa 2009

R&D increases the understanding of business assumptions to help teams define and focus on business-relevant technologies.

- As Timken began to diversify its product set, R&D reevaluated its efforts to effectively match R&D goals to business priorities because:
  - Teams could not specify the needs underlying the business’ articulated wants.
  - Teams could not prioritize their projects as businesses had not reconciled tradeoffs across stated objectives.
  - R&D teams and business partners used different language and terminology, hindering the business’ assessment of value of R&D efforts.

- To solve these issues, Timken R&D leveraged its technology roadmapping process to better equip its innovation teams with the tools necessary to define critical technology goals.

Source: Timken; CEB analysis.
Surfacing business assumptions underlying BU goals provides context for R&D to focus and clarify its support.

- R&D interviews product managers about their goals and replays their findings on both a one page product line strategy summary and a visual product map, developing a mutual understanding of the assumptions underlying business strategy.

- Pushing business managers to articulate “uncommitted product needs” helps R&D plan for longer-term technology needs.

- R&D derives business “critical-to-customer” assumptions underlying business goals to surface what the business truly believes drives market success.

UNDERSTANDING THE BUSINESS ASSUMPTIONS

R&D Team/Product Manager Interview

<table>
<thead>
<tr>
<th>Questions</th>
<th>Facts</th>
</tr>
</thead>
</table>
| **Interview Guide** | **Product Category**
| 1. Where do you see the future state of your BU? What type of products will be offered? | **Product Plan Vision and Target**
| 2. What do you need today to reach your described future state? In 1 year? 3 years? 5 years? | - Grow share by 5%
| **High Penetration Markets** | - Reduce cost by 20%
| Mining, construction | - Corrosion resistant coating
| **Strategy** | - Fill out product line
| - Fill out product line | **Immediate Needs**
| **Product Map for Assumption Validation** | **Longer term needs**
| *Illustrative* | - New coatings and seals
| Source: Timken: CEB analysis. | - Alternative materials

Product Map for Assumption Validation

**Q**: What are the critical factors you need for success on this project from the customer’s perspective?

**Surface Business Assumptions**

1. Lowering cost of our product is key (Cost)
2. Increasing number of heavy load uses (Strength)

**Critical-to-Customer Attributes**

(Key Assumptions)

1. Lowering cost of our product is key (Cost)
2. Increasing number of heavy load uses (Strength)

**Assumptions**

**Surface level of commitment**

Q: How committed to this project are you?

Source: Timken: CEB analysis.

*Critical-to-Customer Attribute: Product characteristic that significantly influences customer purchasing decisions.*
Forcing BUs to make tradeoffs about their top needs reveals enterprise-wide priorities and establishes the rationale for where R&D teams should focus resources.

- Product managers rate a consolidated list of the critical-to-customer attributes across business units through a '100 pennies' exercise which is then weighted by the BU target market value, indicating the economic value of business priorities.

- To sharpen R&D’s enterprisewide view, results are aggregated in a pareto chart, demonstrating which critical-to-customer attributes are most important to the company (and thus most important to be the focus of future technology efforts).

**Implementation Tip:**
Create a glossary of critical-to-customer attributes to ensure common understanding throughout the organization.

### REVEAL CROSS-ENTERPRISE TRADEOFFS

100 Pennies Resource Allocation Exercise for Critical-to-Customer Attributes

**Illustrative**

1. BUs prioritize critical-to-customer attributes aggregated across all BUs

<table>
<thead>
<tr>
<th>Critical-to-Customer Attributes</th>
<th>'100 Pennies' Exercise</th>
<th>BU Market Weight</th>
<th>Target Marketa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>35%</td>
<td>Potential Market $1.5B</td>
<td>$26.25M</td>
</tr>
<tr>
<td>Warranty</td>
<td>3%</td>
<td>3 year Target Growth Rate 5%</td>
<td>$2.25M</td>
</tr>
</tbody>
</table>

Total 100%

2. Weight BU prioritization of each attribute by target market value of BU

3. The prioritization exercise is repeated across divisions for a company-wide view of priorities

**Importance of Critical-To-Customer Attributes: Enterprise-Wide View**

**Illustrative Data**

- Market Value (Billions)
  - Cost
  - Fatigue Performance
  - Debris Resistance
  - Quality
  - Speed to Market
  - Energy Efficiency
  - Warranty
  - Noise Reduction
  - Vibration

**Critical-to-Customer Attributes**

Source: Timken: CEB analysis.

*a Target Market Value is size of market segments in which the BU competes x BU growth rate.
Help teams define—and explain their efforts—by aligning business goals (and technical terms) to technologies.

- Timken’s roadmapping efforts produce a “polar chart” designed to show key technologies in relationship to BU priorities.
- Steeper vectors (development trajectories of technologies) indicate higher business priorities.
- At the end of each vector, R&D has aligned both the technology AND the business term (critical-to-customer attributes) to facilitate ease of communication.
- Focusing on technologies affecting specific customer attributes improves teams’ ability to communicate the business relevance of projects.

**TRANSLATING UNSTATED BUSINESS GOALS**

Integrated Impact Technology Roadmap

*Project Areas by Technology Maturity, Illustrative*

---

**Case-in-Point: Arming R&D with the Right Language**

**Before**
BU stated: “We need to reduce cost.”
R&D: “We propose an assembly method project.”

BU: “No, we don’t want assembly methods, we want reduced cost.”

**After**
BU: “We need to reduce cost.”
R&D: “We propose an assembly method project to improve Technology A which lowers fixed and variable costs as well as tool costs.”
BU: “Good.”

---

© 2013 The Corporate Executive Board Company. All Rights Reserved. RTEC7460513SYN
A BETTER (MORE ASSERTIVE) BUSINESS PARTNER

Timken’s One-Page Enterprise-Wide Goal Summary

- Surfacing BU assumptions enables R&D to focus its efforts and provide effective cover for teams.
- From this exercise, R&D sees two critical benefits:
  - Clear, financially-based rationale for business priorities maps R&D goals to strategic needs and
  - A wealth of information about business needs helps innovation teams engage the business and support their projects.
- R&D’s improved understanding of and focus on business needs and priorities produced a five fold increase in their handoff rate to their downstream process.

“One of our biggest indicators of success is when we hear technicians and business stakeholders speaking the same language and understanding the purpose of the teams’ work.”

Jeff Finefrock
New Product Development Manager
Timken

“Air Cover” Tool Kit

- Validated Business Assumptions: Teams reference business vision and product maps to ensure they understand strategy
- Resource Allocation Exercises: Teams identify internal customers for projects focused on highly rated attributes from the ‘100 pennies exercise’
- Technology Assessment: Teams see impact of technologies on business priorities
- Business Terms Translator: Help teams directly connect language of business goals to technologies supported by R&D

Handoff Rate
Percentage of Horizon 3 Projects Transitioned to Downstream Process

Source: Timken; CEB analysis.
Appendix
SURFACING BUSINESS VISION

R&D Team/Product Manager Interview Guide

Current State:
1. What are the key components of your product category?
2. What current features differentiate your product in the market today?
3. In what ways do your products underperform today?

Future State:
4. What will your product category look like in the future? What type of products will be offered?
5. What are the features that will differentiate your product in the market in the future? What features will competitors’ products have in the future?

Achieving the Future State:
6. In general, what projects are necessary today to reach the future state? In one year? Three years? Five years?
7. What changes or new features need to be addressed first?

Keep questions at a high level to ensure technically oriented interviewers don’t monopolize time during the interview by asking detailed questions.

Understand internal and external pressures the business considers when defining its future state.

Ensure R&D and the business understand the immediate and longer term milestones necessary to achieve success in the future.

Source: Timken; CEB analysis.
Direct R&D teams to opportunity areas that affect critical to customer attributes that create competitive advantages.

- R&D assesses the impact of its technology platforms on the critical-to-customer attributes.
- Understanding opportunities through a technology and market lens enables effective prioritization of R&D efforts.
- The market lens adds objectivity and perspective to an otherwise internally focused exercise and the competitive analysis enables R&D to either drive urgency of critical opportunity areas, or spot areas where the function may be over-investing.
- Potential technology areas to address critical-to-customer attributes are defined by the technology platform owner.

### TECHNOLOGY-MARKET IMPACT ANALYSIS

#### Technology Impact Assessment

**Critical-to-Customer Attributes**

<table>
<thead>
<tr>
<th>Tech A</th>
<th>Tech B</th>
<th>Tech C</th>
<th>Tech D</th>
<th>Superior to Timken</th>
<th>On Par with Timken</th>
<th>Inferior to Timken</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Product Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>++</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>++</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bear Inc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wideload Corporation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Competitor Profile

- **Bear Inc**
- **Wide Load**
- **Timken**

#### Assess Technologies Impact on Customer Needs

**Key:**
- ++: High Impact
- +: Some Impact
- 0: No Impact

#### Understand Technical Capabilities Relative to Competitors

**Key:**
- Not Competitive
- Competitive
- Leader

#### Keep Market Position In Mind

**Key:**
- Superior: Competitor “wins” > 80% of the time.
- On Par: Timken wins ~50% of the time.
- Inferior: Timken wins > 80% of the time.

#### Technology Lens:

Determine the impact of technology on customer needs.

#### Market Lens:

Determine competitive differentiation of technology and market positions.

#### Opportunity Area Prioritization:

Select technologies that most impact customer needs AND provide a competitive advantage.