CEB
WHAT THE BEST COMPANIES DO

TIMKEN'S GOAL VALIDATION ROADMAPS

TIMKEN

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.

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

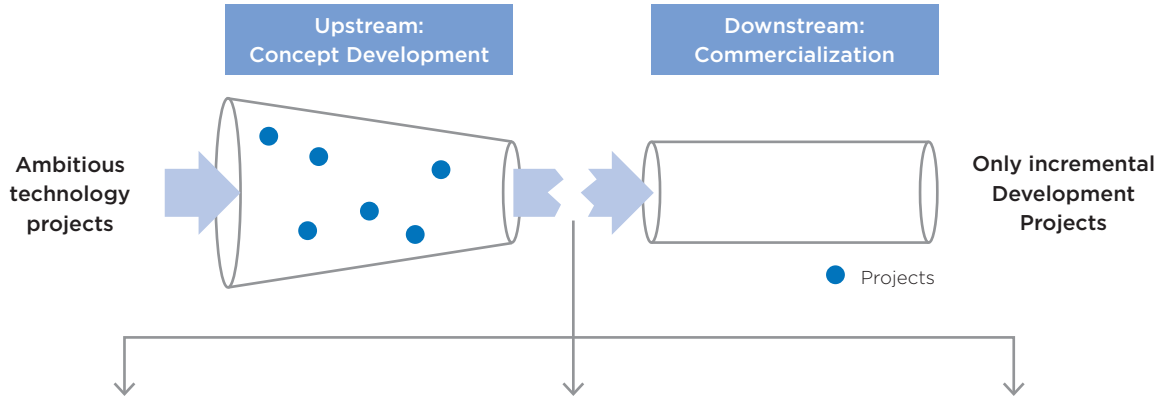
- As Timken began to diversify its product set, R&D reevaluated its efforts to effectively match R&D goals to business priorities because:
  - Teams could not specify the needs underlying the business' articulated wants.
  - Teams could not prioritize their projects as businesses had not reconciled tradeoffs 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.

EXECUTING WITH INCOMPLETE INFORMATION

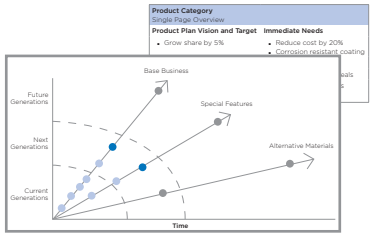
TIMKEN

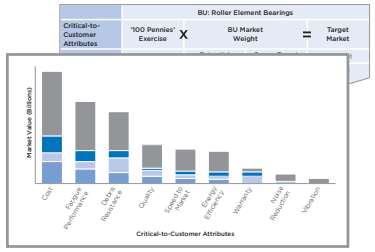
The Challenge: Timken R&D Pipeline

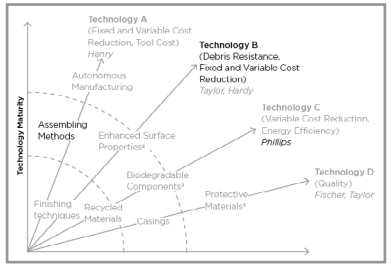
Circa 2009



Challenges	R&D teams are at a disadvantage in justifying their projects when they do not understand the assumptions underlying business goals	R&D teams cannot direct the focus of projects when the business-level tradeoffs are unclear	R&D cannot communicate the value of its projects to the business
Timken Solution	**Surface Business Assumptions** R&D understands and validates assumptions underlying business goals	**Reveal Cross-Enterprise Tradeoffs** Force enterprise-wide tradeoffs to focus R&D priorities	**Create a Common Set of Terms** Directly link BU needs to technology goals on a go-forward basis
Resources	Assumptions Validation Map	Enterprise-wide Assumption Valuation	Integrated Impact Technology Roadmap







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 TIMKEN

R&D Team/Product Manager Interview

Questions

Interview Guide

1. Where do you see the future state of your BU? What type of products will be offered?
2. What do you need today to reach your described future state? In 1 year? 3 years? 5 years?

Facts

Product Category
Single Page Overview

Product Plan Vision and Target
- Grow share by 5%

High Penetration Markets
- Mining, construction

Strategy
- Fill out product line

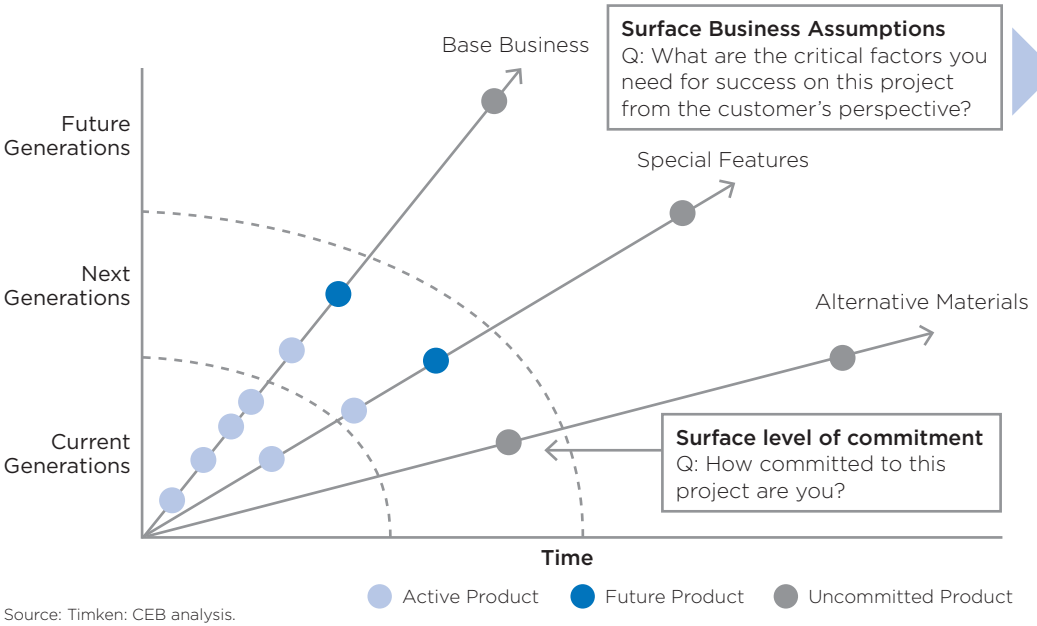
Immediate Needs
- Reduce cost by 20%
- Corrosion resistant coating

Longer term needs
- New coatings and seals
- Alternative materials

Source: Timken: CEB analysis.

Product Map for Assumption Validation

Illustrative



Assumptions

Critical-to-Customer Attributes[a] (Key Assumptions)

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

Source: Timken: CEB analysis.

[a] Critical-to-Customer Attribute: Product characteristic that significantly influences customer purchasing decisions.

REVEAL CROSS-ENTERPRISE TRADEOFFS

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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.

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

Illustrative

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

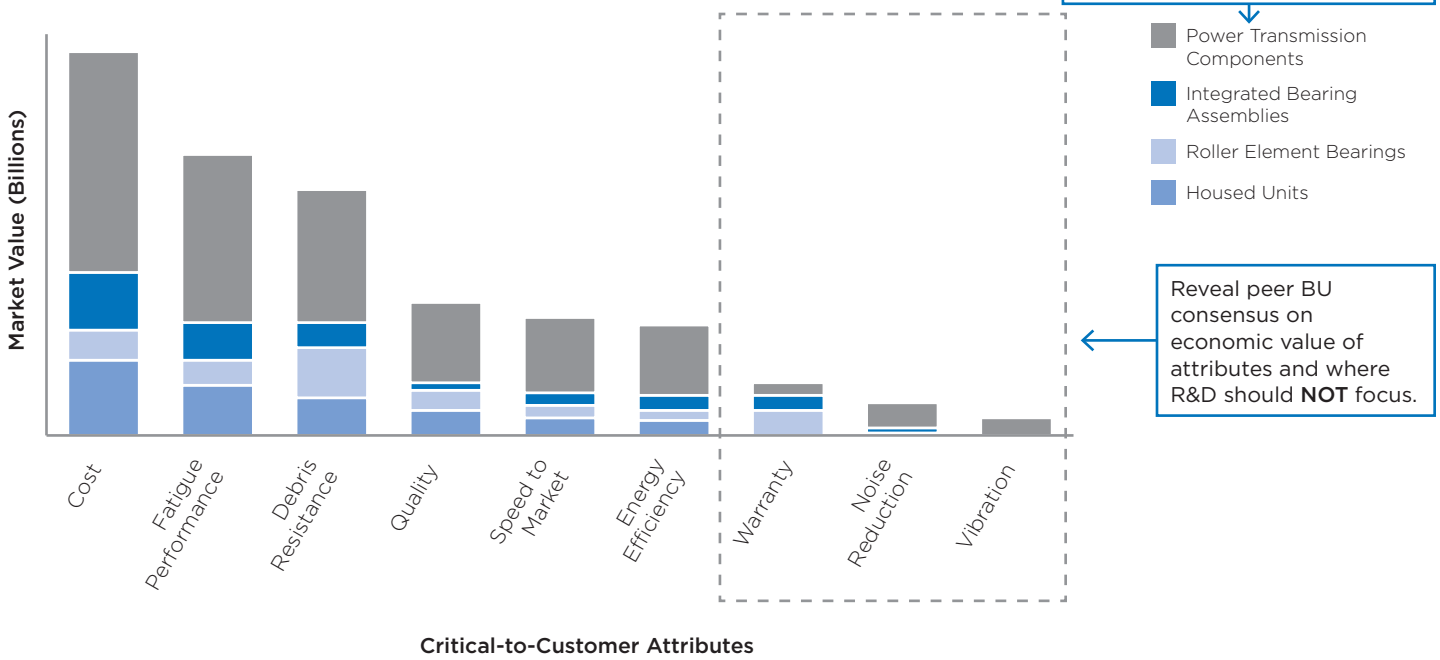
	BU: Roller Element Bearings				
Critical-to-Customer Attributes	**'100 Pennies' Exercise**	**X**	**BU Market Weight**	**=**	**Target Market[a]**
Cost	35%		Potential Market $1.5B	3 year Target Growth Rate 5%	$26.25M
Warranty	3%				$2.25M
Total	**100%**				

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

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

Illustrative Data

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



Reveal peer BU consensus on economic value of attributes and where R&D should **NOT** focus.

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

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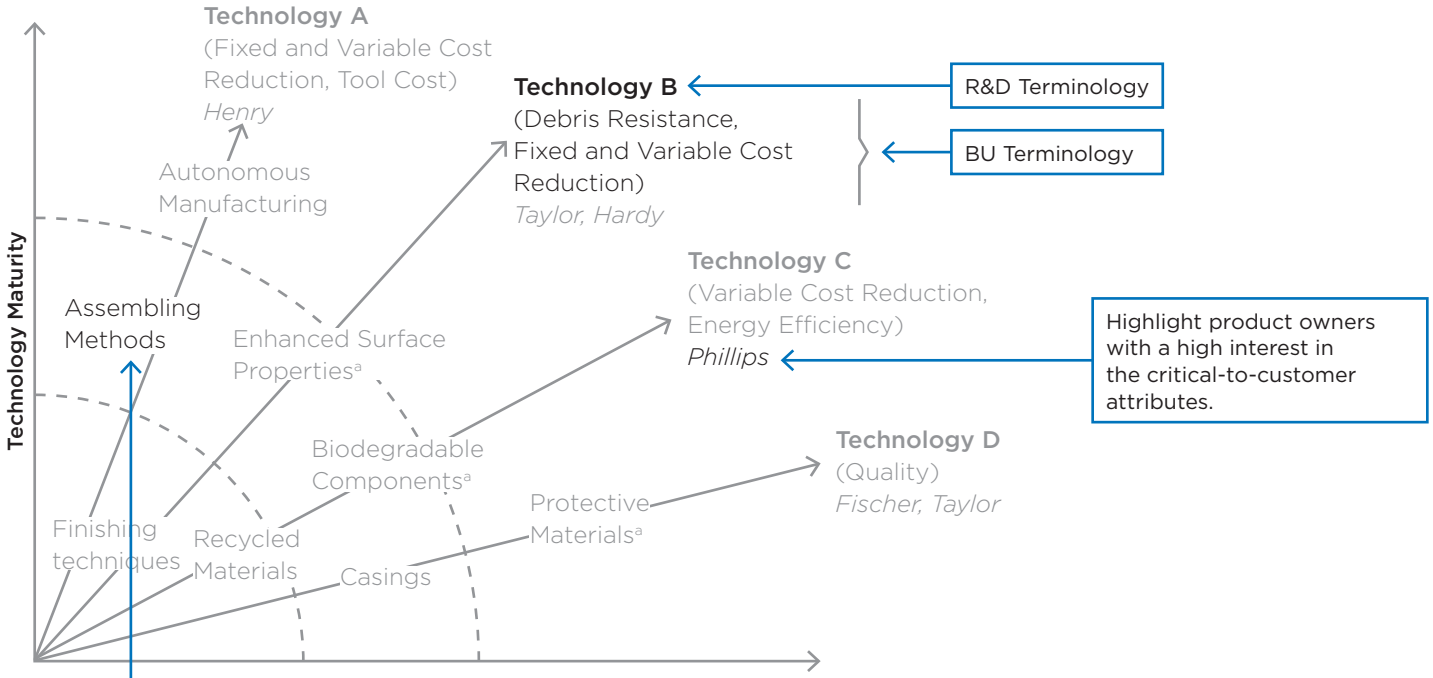
Integrated Impact Technology Roadmap

Project Areas by Technology Maturity, Illustrative



Source: Timken; CEB analysis.

[a] Future project areas.

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."

Source: Timken; CEB analysis.

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

A BETTER (MORE ASSERTIVE) BUSINESS PARTNER

TIMKEN

Timken's One-Page Enterprise-Wide Goal Summary

R&D asserts its focus on and support of enterprise-wide goals...

...on the basis of the robust assumptions validation process.

R&D priority areas are directly linked to business priorities.

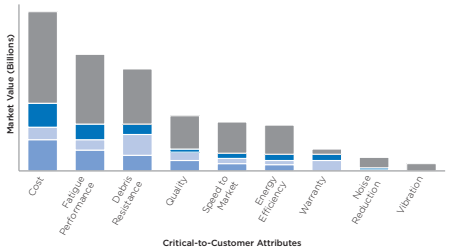
R&D's Priority Areas

1. Reducing Cost
- New Assembly Methods
- Alternative Materials
- Cost Efficient Heat Treatment

2. Improving Fatigue Performance
- Advanced Materials
- Damage and Wear

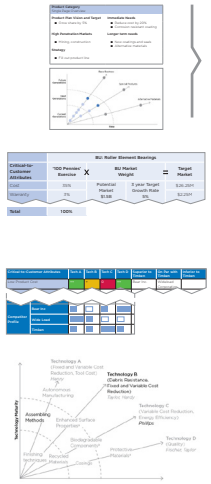
3. Improved Debris Resistance
- Corrosion Reduction

Enterprise Prioritization of Customer Attributes



Source: Timken; CEB analysis.

"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'

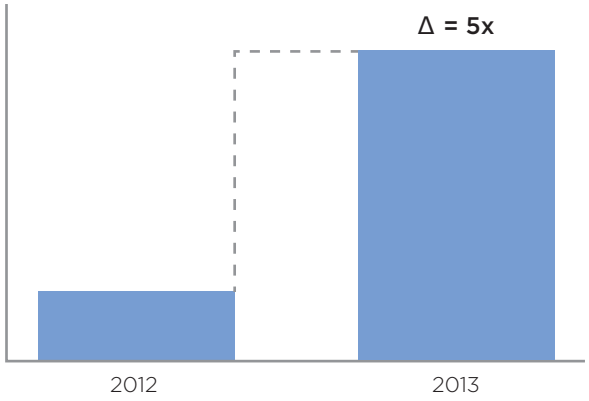
Technology Assessment: Teams see impact of technologies on business priorities

Business Terms Translator: Help teams directly connect language of business goals to technologies supported by R&D

Source: Timken; CEB analysis.

Handoff Rate

Percentage of Horizon 3 Projects Transitioned to Downstream Process



Source: Timken; CEB analysis.

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WHAT THE BEST COMPANIES DO

Appendix

Engage the business in strategic conversations about the future to help R&D better understand the underlying rationale for business priorities.

SURFACING BUSINESS VISION

TIMKEN

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.

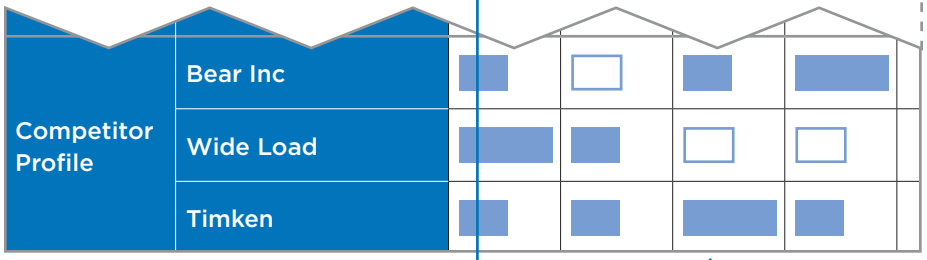
- R&D assesses the impact of its technology platforms on the critical-to-customer attributes.
- Understanding opportunities through a technology and market lens enables effective prioritization of R&D efforts.
- The market lens adds objectivity and perspective to an otherwise internally focused exercise 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

TIMKEN

Technology Impact Assessment

Critical-to-Customer Attributes	Tech A	Tech B	Tech C	Tech D	Superior to Timken	On Par with Timken	Inferior to Timken
Low Product Cost	++	+	0	++	Bear Inc.	Wideload Corporation	



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.

Source: Timken; J. Paap, Customer Focused Technology Planning, 1996-2010; CEB analysis.