The Best of the Best: Learn Top Quartile Practices in the Front End

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Co-Sponsored Executive Series Event
Today’s Agenda

- **9:00 – 9:15** - Introduction
- **9:15 – 10:45** - Front End of Innovation Survey Results
  
  10:45 – 11:00 Break

- **Case Studies from “Best of the Best”**
  - 11:00 -11:45 – Strategy and Culture to Sustained Organic Growth (P&G – John Leikhim)
  - 11:45 – 12:00 – Morning wrap-up and lessons learned
  
  12:00 – 1:30 Lunch
  - 1:30 – 2:15 – Knowledge Sharing and Communities of Practice (Corning – James Scott)
  - 2:15 – 3:00 – Identifying Opportunities in a Disruptive Market Place (Intel – Chuck House)
  
  3:00 – 3:15 Break
Today’s Agenda

- **Innovation Intervention**
  - 3:15 – 4:00 Using the FEI Tool to Set the Stage for Change – (Nancy Eickman – Honeywell; Kathy Harold-Marlowe – Marlowe and Associates)

- **4:00 – 4:30 Roundtable Breakout Discussion**
  - 4:30 Symposium Ends

- **5:00 – 6:00 – Kick Off Key Note: Growth and Renewal with the Faces of Innovation (Tom Kelly, General Manager of IDEO)**
  - 6:00 Cocktail Reception
Survey Objective

To determine the key Front End of Innovation (FEI) skills and activities that a company needs to be proficient in order to achieve robust growth and sustained profitability.
Agenda

Definitions
- What is the Front End
- NCD Model
- Terminology used in the survey

Survey Team and Demographics

Survey Results
- Outcome measures
- Engine (Leadership, resources and climate)
- Engine (Knowledge Sharing and Teams)
- Category I projects
- Category II projects
What is the “Front End of Innovation?”

- “Front End of Innovation” is defined by:
  - Activities that come before the “formal and well structured” New Product Development (NPD) Portion

FEI activities are less structured and less predictable

Structured with a formalized and prescribed set of activities and questions

New product development portion includes BOTH new product and process

New Product Development Portion

Commercialization
### Why Focus on the Front End?

#### Differences

<table>
<thead>
<tr>
<th></th>
<th>Front End Innovation</th>
<th>New Product Development Stage</th>
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</thead>
<tbody>
<tr>
<td><strong>Work</strong></td>
<td>Experimental, often chaotic. “Eureka” moments. Can schedule work – but not invention</td>
<td>Disciplined and goal oriented with a project plan</td>
</tr>
<tr>
<td><strong>Commercialization</strong></td>
<td>Unpredictable</td>
<td>High degree of certainty</td>
</tr>
<tr>
<td><strong>Date</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Funding</strong></td>
<td>Depends. In the beginning stages many projects may be “bootlegged”</td>
<td>Budgeted</td>
</tr>
<tr>
<td><strong>Revenue Expectation</strong></td>
<td>Often uncertain with a great deal of speculation</td>
<td>Believable with increasing certainty as the release date gets closer</td>
</tr>
<tr>
<td><strong>Activity</strong></td>
<td>Individual or team emphasis in areas to minimize risk</td>
<td>Multi-function product/process development team</td>
</tr>
<tr>
<td><strong>Measure of Progress</strong></td>
<td>Strengthened Concept</td>
<td>Milestone Achievement</td>
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</table>
Why develop a model?

- Will allow for a common set of definitions
  - No common language or definition of the key processes of the front end

“Can’t tame what you can’t name”
New Concept Development Model (NCD)

Provides a common language and terminology necessary to understand the “Front End of Innovation”

Definitions

- **Opportunity**
  - A business or technical need that the company is interested in order to:
    - Capture competitive advantage
    - Respond to a threat
    - Solve a problem

- **Idea**
  - Most embryonic form of the product

- **Concept**
  - Defined form (i.e. written and visual) with features and customer benefits combined with an understanding of the technology needed
Definitions – An example

- **Opportunity**
  - Food company identifies the need to develop low fat products due to rising consumer interest in low fat
  - Company performs detail analysis on trends

- **Idea**
  - Several methods are identified for delivering nonfat potato chips.
  - Candidate molecules are envisioned which provide the same flavor. but would not be absorbed by the body.

- **Concept**
  - Scientific program started and funded to develop specific types of nonfat molecules

- **Product**
  - Olestra – a non-fat substitute
Category I vs. Category II Projects

Low Uncertainty Category I Projects
- Incremental Extension
  - iPod Photo
  - mini iPod
  - iPod 40 MG
- New Platform: iPod 20 MG

High Uncertainty Category II Project
- High Market Uncertainty due to already entrenched competitors
- New Platform: iPod Shuffle

Low Uncertainty Category II Project
- (Already understand the market)
- New Platform: iPod Shuffle
Category I vs. Category II Projects

High Uncertainty Category II Project
(High Technical and Market Uncertainty)
**Category I vs. Category II**

Disproportionate wealth creation from discontinuous opportunities

Based on a study of 150 companies in 30 different industries. (Kim and Mauborgne. “Blue Ocean Strategy,” HBR, October 2004.)
Agenda

✔ Definitions
  ✔ What is the Front End
  ✔ NCD Model
  ✔ Terminology used in the survey

- Survey Team and Demographics
- Survey Results
  ✔ Outcome measures
  ✔ Engine (Leadership, resources and climate)
  ✔ Engine (Knowledge Sharing and Teams)
  ✔ Category I projects
  ✔ Category II projects
Survey Team

Developed by a World Class Academic and Industry Team

**Industry:** Heather Alderman (IRI), Christina Bramante (Cabot), Scott Boyce (Rohm and Haas), Robin Dvorak (IRI), Cindi Hartz (Dow Corning - retired), Kathy Herald-Marlowe (Marlowe and Associates), Michael Incorvia (International Flavors & Fragrances), Drew Kugler (WelchAllyn), Ken Lauer (Creative Problem Solving Group), Rita Pilate (J&J Consumer), Lorrette Pruden (Inventive Strategies), Becky Seibert (Crompton), Jeff Stirrat (Ethicon) and Brenda Tollett (Valvoline).

**Academia:** Eric Von Hippel (MIT), Elko Kleinschmidt (McMaster University), Peter Koen (Stevens), Richard Reilly (Stevens) and Dorothy Leonard (Harvard).

**Support:** NSF, Consortium for Corporate Entrepreneurship (Becton Dickinson, Exxon Mobil, Ethicon (division of Johnson and Johnson) Honeywell and Kraft) at Stevens as well as Cabot, LORD corporation and Rich Products.

**Sponsorship:** Official sanctioned research and survey project of the Industrial Research Institute (IRI).

...A true joint effort of 18 companies/ institutions and 19 people
Survey Methodology and Background

- Surveyed > 170 SBU’s from 110 companies including GE, 3M, P&G and Intel

- Funded by National Science Foundation and Consortium for Corporate Entrepreneurship at Stevens Institute of Technology

- Followed highest standards of survey research methods
  - More than 1 year of survey development including > 20 case studies and 5 pilots
  - Multiple respondents per company to ensure reliable data
  - All conclusions are drawn from multiple questions
Agenda

✓ Definitions
  ✓ What is the Front End
  ✓ NCD Model
  ✓ Terminology used in the survey

✓ Survey Team and Demographics

Survey Results
  ▪ Outcome measures
  ▪ Engine (Leadership, resources and climate)
  ▪ Engine (Knowledge Sharing and Teams)
  ▪ Category I projects
  ▪ Category II projects
Outcome Measures

Regression Analysis using the Front End Activities as the variables and Growth and Innovation Proficiency as the outcome

- Front End Success Measures
  - Companies with high front end proficiency generate projects with significant competitive advantage, anticipate the next wave of innovation, have a balanced portfolio of opportunities and expect to exceed their 3 year sales and profit objectives from new projects in the FEI

- Innovation Success Measures
  - Companies with high innovation proficiency have a 3 year track record of projects which are consistently on budget and time which exceed sales and profit objectives

Which factors are highly correlated with Proficiency in FEI and Innovation?
Engine

Which activities are strongly correlated with FEI and Innovation Outcomes?

- Consists of:

  - Vision 0
  - Strategy 0
  - Resources 0
  - Climate 0

Which one is the most important?
Engine

- Consists of:
  - Vision
  - Strategy
  - Resources
  - Climate

Hear John Leikhim discuss Strategy and Climate at P&G

<table>
<thead>
<tr>
<th>Vision</th>
<th>Strategy</th>
<th>Resources</th>
<th>Climate</th>
</tr>
</thead>
<tbody>
<tr>
<td>19%</td>
<td>40%</td>
<td>24%</td>
<td>17%</td>
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</table>

% of outcome explained
Resources

A key issue which separates companies who are successful in the Front End Incremental Development and Implementation Stage Gate Portfolio Project Management Design for Six Sigma Next quarterly earnings

New Platforms Future earnings

Quote from an innovation workshop: “We have objectives on white space opportunities - but no headcount. We reward results ... we don’t assign resources to projects which do not have short term deliverables.”
Engine (People Side)

Which activities are strongly correlated with FEI and Innovation Outcomes?

Consists of:

- Knowledge Sharing 0
- Communities of Practice 0
- Effective Teams 0
- Virtual Teams 0

Which one is the most important?
Communities of Practice

- Creates new knowledge within the community
- Connects, acquires, exchanges and builds new knowledge
- New science occurs through the process of building upon internal and external knowledge communities

Breakthrough Knowledge Usually Occurs at the “Boundaries of the Old” McDermott, 1999

Engine

Consists of:

- Knowledge Sharing
- Communities of Practice
- Effective Teams
- Virtual Teams

Hear James Scott discuss Knowledge Sharing and Communities of Practice at Corning
Virtual Teams

- Teams are able to work effectively even when members are at distant locations
- Competent in working in culturally different countries
- Proficient in IT tools which allow people to effectively communicate
Category I Projects Quiz

Which Category I activities are strongly correlated with FEI and Innovation Outcomes?

Choose the 3 most critical

- Idea Genesis (Ex: Focus Groups, Brainstorming)
- Current market Knowledge and trends
- Developing a solid business case
- Selection process using traditional financials
- Idea selection process
Category I

Idea Genesis (Ex: Focus Groups, Brainstorming)

Choose the 3 most critical

Current market Knowledge and trends

Market Knowledge

Idea Genesis

28%

Business Case

29%

27%

Influencing Factors

Opportunity Analysis

Idea Generation and Enrichment

Idea Selection

Concept Definition

Developing a solid business case

Selection process using traditional financials

28% NPD Tech SG
Idea Genesis

Rite-Solutions

A software company that builds command and control software for the Navy

Idea Proposals
Become stocks and start trading at $10.00/share

Money
Each employee has $10,000 in “opinion” money

Product
If the stock becomes a product employees can share in the proceeds in the form of real money

VuGo Multimedia System
Category II Project Quiz

Which Category II Project activities are strongly correlated with FEI and Innovation Outcomes?

- Idea generation via technology driven inventions
- Idea generation via ethnography
- Idea generation via partnering
- White space - disruptive market knowledge
- Current Market Knowledge

Influencing Factors:
- Idea Generation and Enrichment
- Opportunity Analysis
- Idea Selection
- Concept Definition
- Experimentation
- Concept Selection (i.e. Developing a solid business case)
- Idea selection process
- NPD
- Selection mgt process that uses risk tools
Category II Projects

Idea genesis via technology driven inventions

Idea genesis via ethnography
Idea genesis via partnering

White space - disruptive market knowledge

Current Market Knowledge

29%

Opportunity Identification
Idea Generation and Enrichment
Idea Selection
Concept Definition
Experimentation

Influencing Factors

Concept Definition
(i.e. Developing a solid business case)

Selection Mgt Process that uses Risk Tools

Current Market
White Space
Technology Inventions
Experimentation
Risk

20%
13%
29%
20%
17%

Idea selection process
Market Knowledge and Trends

Armstrong Ceiling Tile

![Image of Armstrong Ceiling Tile in a modern office setting]
Market Attack Team

A process for rapidly developing actionable plans for large opportunities

Phase 1 (Charter)
Phase 2 (Market and Technology Analysis)
Phase 3 (Business Concept Generation)
Phase 4 (Business Case)

Project Scope
Select broad concepts to focus on
Select best concepts
Challenge Workshop
TR1 Business Plan

Effort ideally includes 3 - 5 full time people

Preparing to Dive
1st Deep Dive
2nd Deep Dive
Race to the Finish
Market Attack Team

Why Full Time?

Individual creativity occurs when:
- People are on a mission
- Can FOCUS on one activity for a significant part of their day
- Are challenged and involved in their work

Individual creativity does NOT occur when:
- People feel they are on a treadmill
- Experience a highly fragmented day
- Have more group discussions rather than individual meetings
- Have lots of last minute changes in their plans and schedules
- After effects continue onto the 2nd and 3rd day

Market Knowledge and Trends

Armstrong Ceiling Tile
Strategy Value Canvas

Ringling Bros & Barnum & Bailey

Regional Circuses

Cirque du Soleil

Disruptive Business Models

<table>
<thead>
<tr>
<th>Why sustaining businesses don’t compete with new business model</th>
<th>Initial Customer</th>
<th>Technology Advances</th>
<th>Business Model with low price cost structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Niche is initially too small and takes focus from mainstream customers</td>
<td>Non consumer (New Market Disruption)</td>
<td>Angioplasty vs. CABG</td>
<td>Discount Retailer vs. Full Scale Merchandiser</td>
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</table>

Market segment has too low a profit and sustaining business will gladly exit

Low end low margin (Low End Disruption)

- Mini-mills vs. Integrated Steel Mills
- Discount Retailer vs. Full Scale Merchandiser


Hear Chuck House discuss how Intel identifies opportunities in a disruptive market
Disruptive Business Models

Low End Disruption: Mini-Mills
Disruptive Business Models

What is a Disruptive Business?

Up-Market Migration of Steel Minimills

% of Steel Production

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</thead>
<tbody>
<tr>
<td>Sheet Steel</td>
<td>7%</td>
<td>12%</td>
<td>18%</td>
<td>25-30%</td>
</tr>
<tr>
<td>Structural Steel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Angle Iron: Bars and Rods</td>
<td>7%</td>
<td>12%</td>
<td>18%</td>
<td>25-30%</td>
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<tr>
<td>Rebar</td>
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Disruptive Businesses over time will improve and attack the sustaining business.


Disruptive Business Models

New Market Disruption: Angioplasty

CABG
(Cardiac Arterial Bypass Graft)

Angioplasty
Disruptive Business Models

What is a Disruptive Business?

Up-Market Migration of Angioplasty

Procedures (000s)

Bypass

Stents

Balloon Angioplasty
Disruptive Business Models

“This is the pain of technology transitions. You can either sit and wait like Kodak or Fuji Photo and fall off the a cliff when it happens. We’re transitioning the light-lens traditional copiers out as quickly as possible. If you look at what that’s cost us, this company would have been growing for the last three years very nicely. It cost us six points of growth in 2003, four points of growth last year. It will cost us probably a point and half this year. So it’s going away…. It’s always more attractive to stay in the old technology from a profit standpoint. Always. But you’ll be going out of business.”

Quote from Anne Mulcahy, CEO, Xerox, Wall Street Journal, April 24, 2006
Experimentation

- **Experimentation needs to be managed explicitly**
  - Organization, process design choices, technology adoption

- **New technologies (i.e. computer modeling and simulation)**
  - Amplify the impact of experimentation
  - Create the potential for higher R&D performance, product innovation and value creation for customers.

- **Companies that master and integrate these technologies must change**
  - Processes, organization and how innovation is managed

Managing Uncertainty

Experimentation should be valuable in these domains

“You don’t know what you don’t know”

The ability to manage uncertainty is fundamental to innovation
Experimentation comes to Bank of America

Financial Center (5 branches)
Provides the ability to advise across product lines with expanded people, technology and environmental capabilities

Express Center (5 branches)
Provides fast friendly service with convenient access to routine transactions with self-directed options and teller services
Experimentation

Experimentation comes to Bank of America

Traditional Center (10 branches)
Provide traditional banking products and services with enhanced processes and technology
Risk Management

- **Portfolio methodologies based on multiple factors of:**
  - Technical Success Probability
  - Commercial Success Probability
  - Reward
  - Strategic Fit
  - Strategic Leverage
  - *Using Anchored Scales*

- **NOT JUST FINANCIAL JUSTIFICATION**

- **Use of higher risk “financial tools”**
  - Options
  - Discovery Driven Planning
  - Smart Org
  - Venture Capital – “basics” approach

The prime imperative for high risk projects in the Front End is NOT picking the winners, but killing the losers early.
Risk Management

- **RIGOROUS** use of the Technology Stage Gate for high risk projects

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Ambidextrous Organization

Category II “exploration” Projects
(High market or technology uncertainty)

Category I “exploitation” Projects

“Companies which use ambidextrous organizations are NINE TIMES more likely to create breakthrough products and process than those using other organizational structures....”
from O’Reilly and Tushman, HBR OnPoint, pg 29.

Dual Purpose Organizations

**Ambidextrous**

- Emerging Business
  - Mfg
  - Sales
  - R&D
- SBU Senior Management
  - Existing Business
    - Mfg
    - Sales
    - R&D

**Dual Purpose**

- NewCo Senior Management
  - Emerging Business
    - Mfg
    - Sales
    - R&D
- Executive Sponsor
- SBU Senior Management (CoreCo)
  - Existing Business
    - Mfg
    - Sales
    - R&D

Summary

Engine
- 42% of FEI outcome explained
- Strategy, Resources, Vision and Climate

Knowledge Sharing and Teams
- 27% of FEI outcome explained
- Effective Teams, Knowledge Sharing, Communities of Practice and Virtual Teams

Category I
- 28% of FEI outcome explained
- Opportunity Identification (Current Market Knowledge), Business Case and Idea Genesis

Category II
- 29% of FEI outcome explained
- Opportunity Identification (Current Market and Disruptive Knowledge), Idea Genesis using technology Inventions, Experimentation and Concept Selection via Risk Analysis
- Business Case Not Critical
Improve Understanding of FEI

Benchmark your company

- Complete at least 3 Surveys
  - Senior Management
  - R & D Management
  - Marketing Management

- Compare your company’s 18 key variables against top quartile on the web

Results will be available on the web 2 weeks after receipt of the surveys

www.frontendinnovation.com/survey
Appendix – Survey Measures

Outcome Measures

- Proficiency in FEI
  - Our FEI projects generate competitive advantage; we use tools and methods to anticipate the next wave of innovation, are able to achieve a balanced portfolio of platform and incremental projects, and expect our FEI projects over the next 3 years to exceed our revenue and profit objectives.

- Proficiency in New Product/Process/Service Development
  - All NPD projects over the last 3 years have been on budget and on time, have exceeded our sales and profit objectives, and have opened up new markets that have not been served previously.
Appendix – Survey Measures

Engine Measures - Strategy, Resources and Climate

- **Vision**
  - Our vision is stable over time for front end projects in both market and technology arenas.

- **Strategy**
  - We set aggressive FEI goals, have defined areas of strategic thrust, and align efforts with core competencies.

- **Resources**
  - We allocate sufficient resources to look at new market opportunities, idea generation, idea selection, building FEI business cases, boundary spanning activities and for working on non-official projects.

- **Climate**
  - Our people are actively encouraged to champion new ideas; discuss and consider opposing opinions and diversity of view points; feel that can go out on a limb in putting a new idea forward; tolerate uncertainty and ambiguity; and are not punished for championing failed projects.
Appendix – Survey Measures

Engine Measures - People Side

Knowledge Sharing
- Our company encourages open informal communication across functions, sharing knowledge is recognized and rewarded, encourage and supports relationships between our marketing and technical people.

Communities of Practice
- Our organization encourages and supports communities of practice which includes a dedicated coordinator who has a budget and a formalized time commitment greater than 25%

FEI Teams
- FEI teams have leaders with recognized credibility, assure team performance that exceeds expectations and enable and support all team members. The teams are multi-disciplinary and are selected based on their domain knowledge, are well networked in the organization, have sufficient resources to allow them to concentrate on their project work, are passionately committed to their FEI projects, and spend time and effort beyond their expectations.

Virtual Teams
- FEI teams are effective when members are in locations significantly distant from each other, are proficient in IT tools which allow them to effectively communicate, and are competent in developing projects in multiple countries which are culturally different.
Appendix – Survey Measures

Category I Project Measures

- **Current Market Knowledge**
  - We perform a thorough analysis of the external environment and market potential; our review approach is formal and documented process; we understand our customer’s buying behavior and what drives their purchase decisions.

- **Idea Genesis**
  - We have a systematic method for capturing, sharing and recording ideas received and are proficient in using established methods to identify/obtain new ideas (e.g. focus groups, market surveys, brainstorming).

- **Business Case**
  - Before going forward with a low risk project, we assess the feasibility of manufacturing, of meeting technical requirements, financials, expected competitive response, intellectual property freedom to operate and to develop competitive patents, and market and sales effort are all well understood.
Appendix – Survey Measures

Category II Project Measures

- **Current Market Knowledge**
  - We understand our current customer’s buying behavior, what drives their decisions, anticipate our competitors future reactions, actively look at the margins of our business for over served overserved or underserved customers, we anticipate competition’s future reaction and actively look for opportunities at the margins of our business.

- **White Space or Disruptive Market Knowledge**
  - Our organization actively looks for disruptive business and will accept disruptive margins that are less than our current business.

- **Technology**
  - We identify new ideas by assessing technology driven inventions and new emerging technologies.

- **Experimentation**
  - New products are developed by experimenting with a multitude of ideas with our customers which eliminate undesirable features and allows us to try combinations of traditional and new technologies.

- **Risk Analysis**
  - Project decisions are made using a risk model where both commercial and technical risk are evaluated; projects are managed using a technology stage process where expenditures are narrowly focused on the highest risk areas.