

STLE: Schnellbacher, Emil Jon
2N, Metalworking Fluids 1
Monday May 16 - 4:30 pm



How Did You Come Up With That?

Innovation Best Practices Study in North American Manufacturing Companies

STLE Annual Meeting - May 16, 2022

E. Jon Schnellbacher

Formulas & Solutions, LLC

Allen Park, Michigan

ejonschnellbacher@formulas.solutions

**Based on the North American Chemical Manufacturers
Best Practices Study (NACM-BPS)**



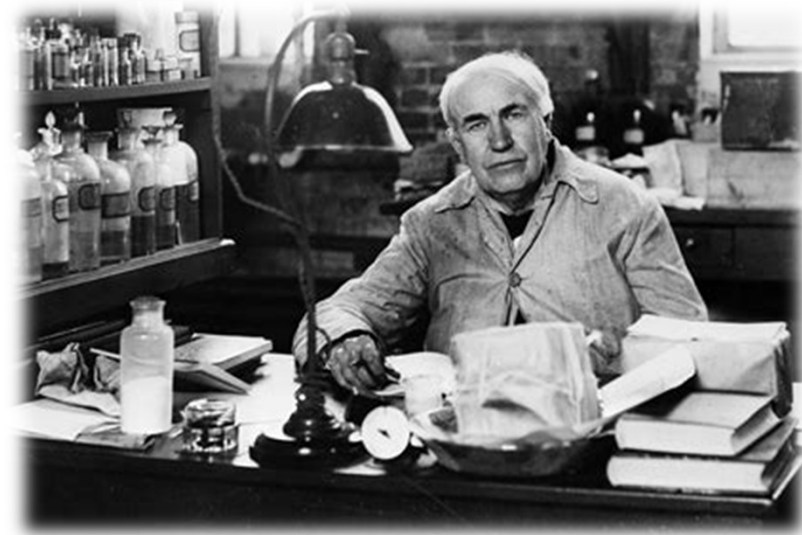
Introduction



Building on the shoulders of giants



Leonardo Da Vinci



Thomas Alva Edison

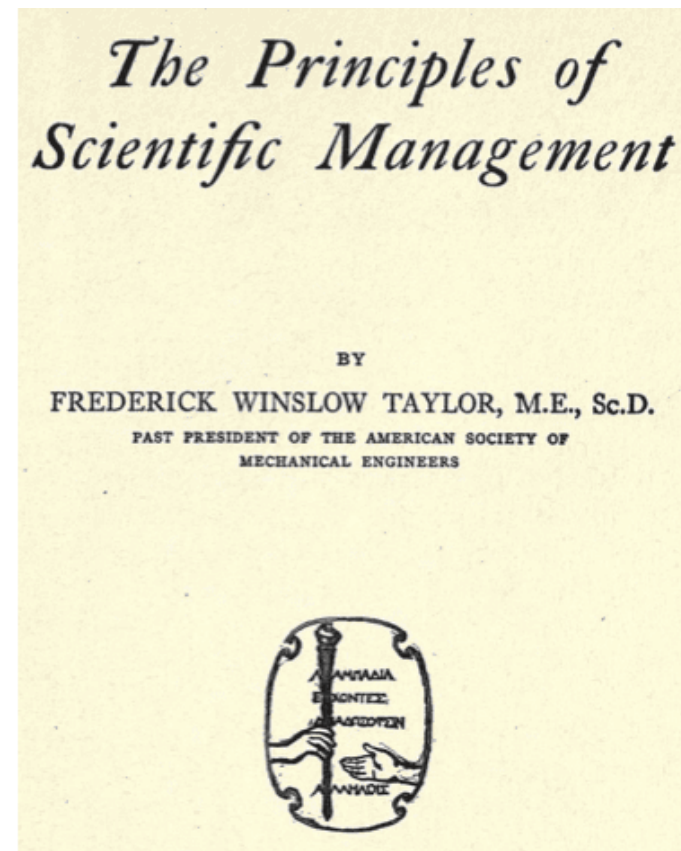
- How did you come up with that?
- Who are our best innovators?
- Why are they considered great?

One more curious innovator

Frederick Taylor introduced work time study metrics or benchmarking;



Frederick Winslow Taylor



Da Vinci, Edison, and Taylor shared a curiosity to deeply study analyze a problem and find answers.

NPD Best Practice Studies

PDMA Organization –

Product Development Management Association

- founded in 1976
- Focus on product development
- Began Identifying winners and losers of new product development (NPD)
- Benchmarked success/failure factors
- Refined 75 S/F factors into theoretical NPD best practices
- Industry NPD best practices snapshot in 1990, 2004, 2012 & 2022
- Discovered gap between academic and practitioner use of NPD-BP
- Global market and industries in BPS

NACM-BPS (this research study)

North American Chemical Manufacturers
Best Practices Study (NACM-BPS)

- Based on the PDMA-BPS (4)
- Focus on:
 - North America
 - Manufacturing
 - Chemical Industry
- Attempts to benchmark
 - NPD best practices
 - NPD success
 - NPD maturity for self assessment

Foundations: PDMA Best Practices Studies

Product Development Management Association (PDMA)

- Four PDMA BP Studies:
 - 1990, 2004, 2012, & 2022
- **32 years between four BPS**
 - 1990-2022 fairly stable trends
- **59% overall success rate**
 - largely unchanged over time

Best vs Rest: Success Rates

PDMA NPD BPS-3 (2003)	The Best	The Rest
Percentage of Firms (category)	24%	76%
Successes	75.5%	53.8%
Successes-Profits	72.4%	47.9%
Sales from New Products	47.6%	21.4%
Profits from New Products	49.1%	21.2%
Number ideas for one success	4.0	9.2

Source: Trends and Drivers of Success in NPD Practices:
Results of the 2003 PDMA Best Practices Study (Barczak, Griffin, & Kahn, 2009)

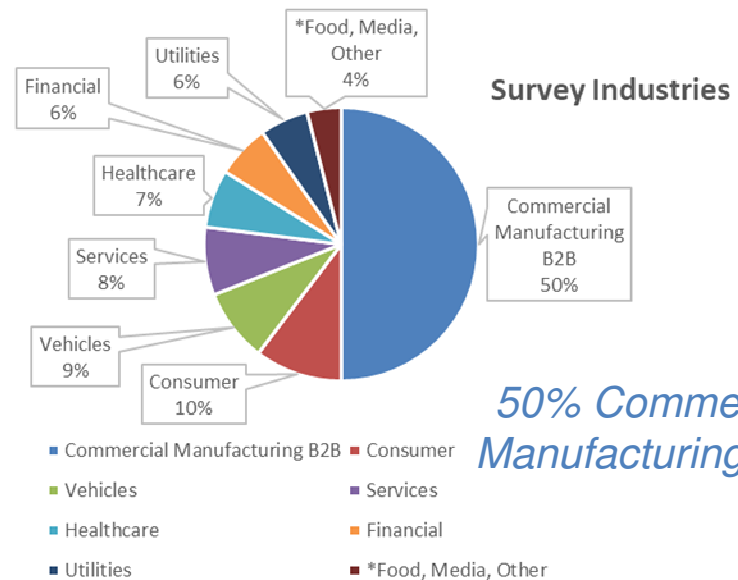
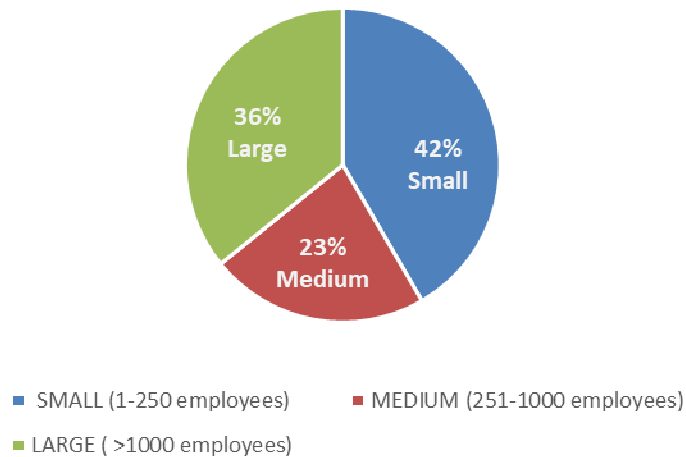
Later, a Delphi method panel of experts grouped all the PDMA identified best practices into seven categories with % importance.

7D-NPD Best Practices

- Strategy 18%
- Research 16%
- Commercialization 15%
- Process 15%
- Project Climate 13%
- Company Culture 13%
- Metrics & Performance Measurement 10%

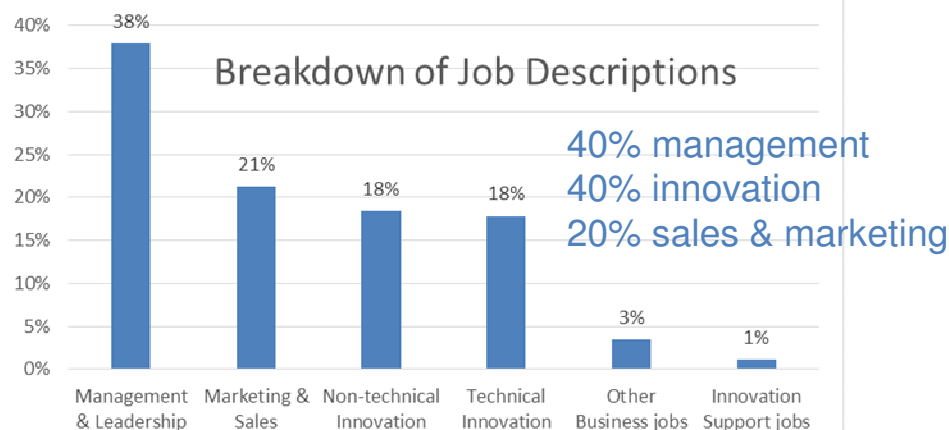
NACM-BPS Company Demographics:

Company Size by Employees

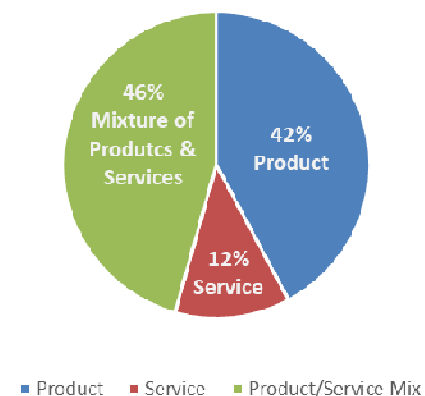


50% Commercial Manufacturing B2B

Breakdown of Job Descriptions

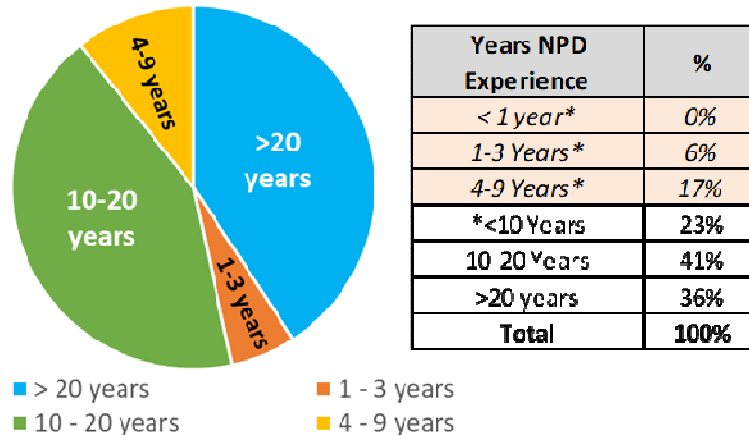


Product, Service, or Mixture %

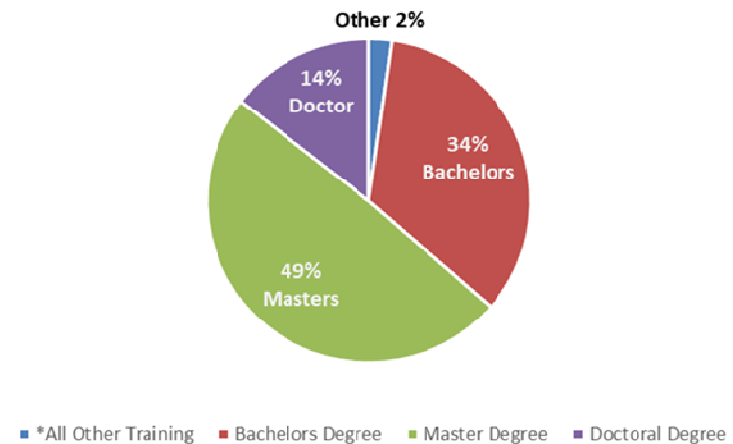


NACM-BPS Demographics:

Manufacturers Years of NPD Experiences (3B)

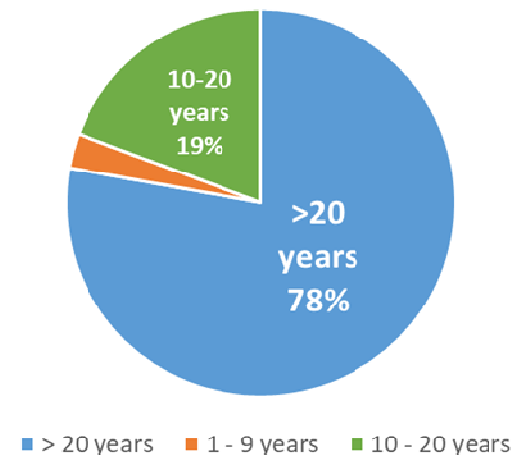


Demographics: Education



- 3000+ invitations, 212 responses
- 83% completed the survey
- 104 responses were manufacturing (products only or product + services)
- 3/4 respondents were male
- 94% had 4+ years NPD experience
hard to make a comparison without NPD experience
- 98% had college degree and
- 63% have graduate degree (Masters & PhD)

Manufacturers Years of Industry Experience (3A)



How was NACM-BPS developed?

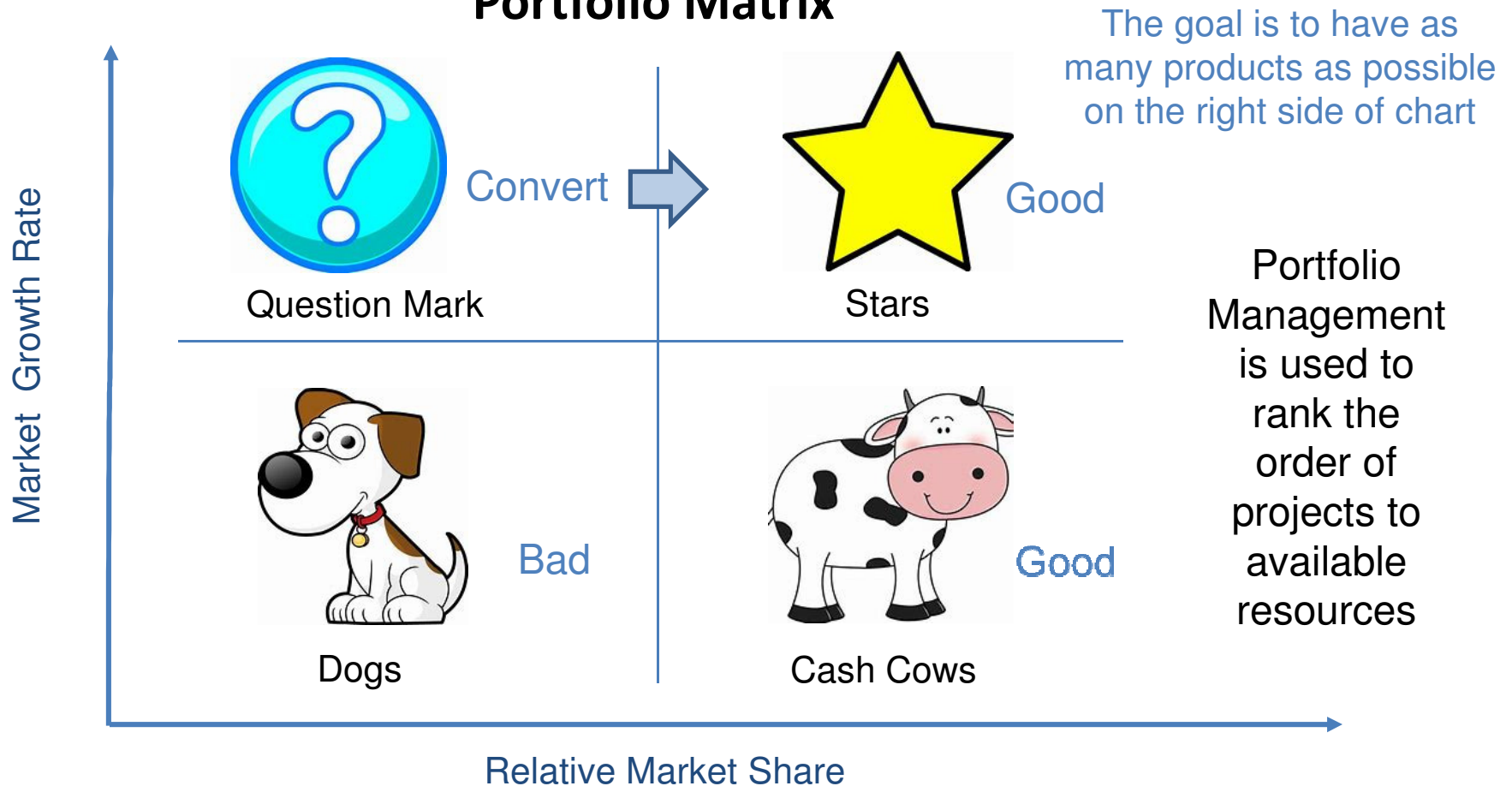
- **PDMA BPS** examines NPD best practices; respondents were global in nature, input from academics and professionals
- **NACM-BPS** was patterned off the PDMA Best Practices Studies but designed to be focused on North American best practices.
- **ACM-BPS** primarily surveyed three groups
 - **PDMA: Product Development Management Association**
 - **ILMA: Independent Lubricant Manufacturing Association**
 - **STLE: Society of Tribologists & Lubrication Engineers**
- In initial NACM-BPS analysis, many were retail, services, software, financial, hospitality, and entertainment industries.
- Today's presentation looks at the NACM population specifically involved in:
 - **manufacturing products or**
 - **products+services.**

Product Portfolio Management

Things we need to know

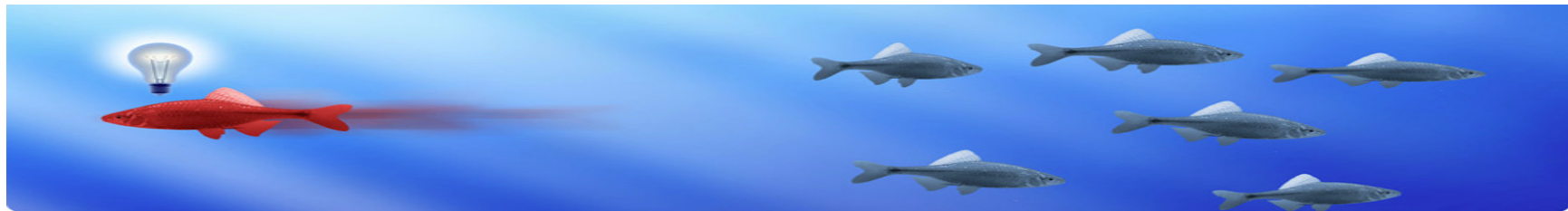
Boston Consulting Group (BCG)

Portfolio Matrix



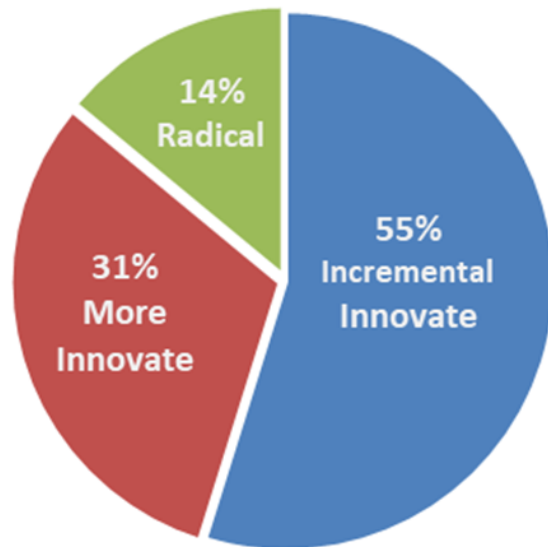
Levels of Innovation

Things we need to know



Results: Innovation Strategy & Level

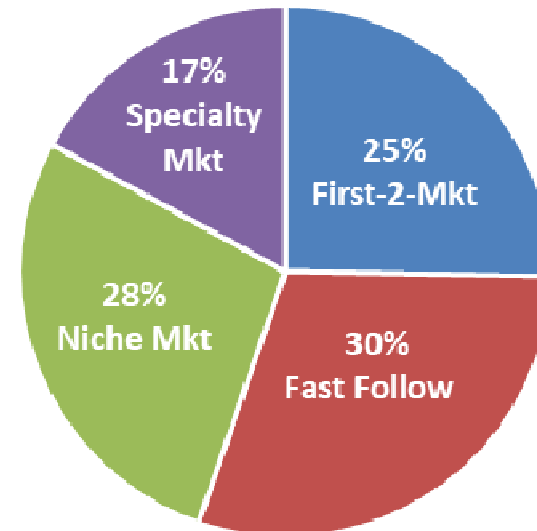
Level of Innovation



Level of Innovation	%
Incremental Innovation	55%
More Innovative	31%
Radical Innovation	14%
Total	100%

86% of innovation is incremental and innovative (not radical)

Innovation Strategy



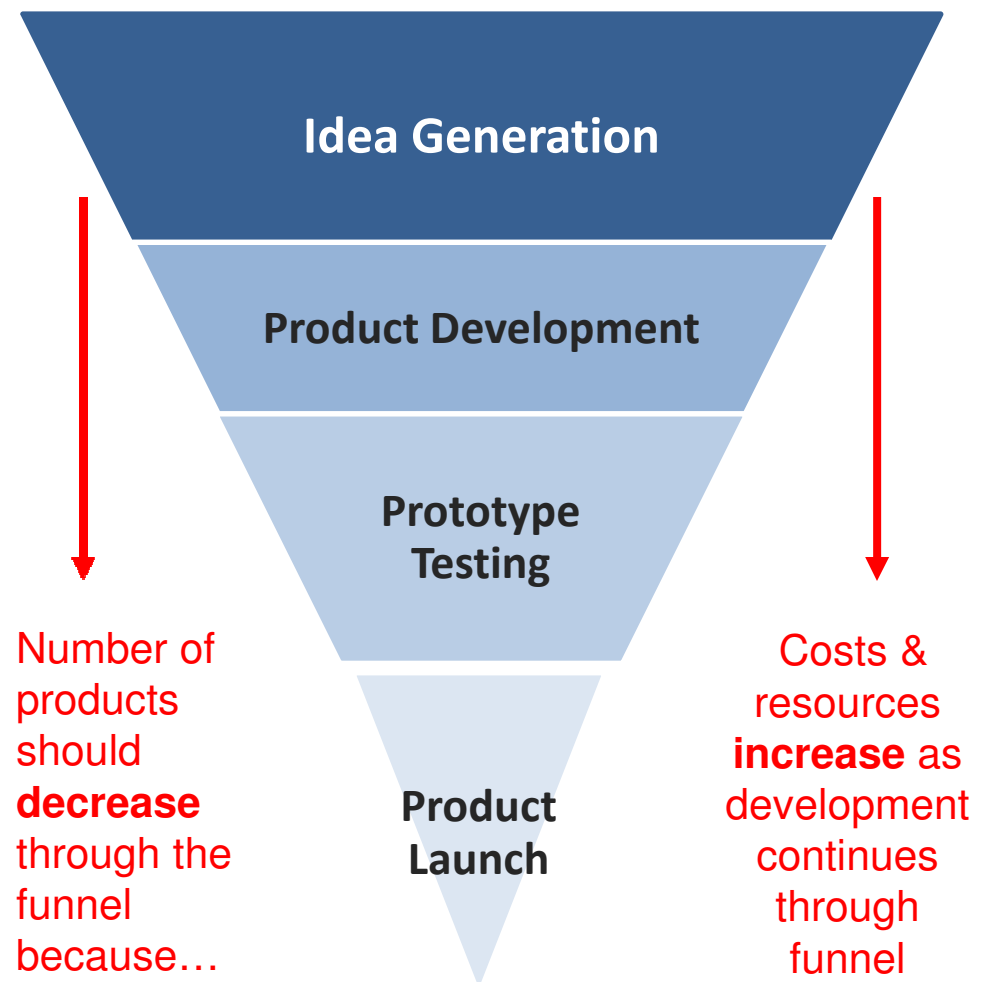
Innovation Strategy	%	n
First-to-Market 25%	25%	43
Fast Followers 30%	30%	51
Niche Market 28%	28%	47
Specialty Market 17%	17%	29
Total	100%	170

Response is fairly evenly divided between each of the four strategies

New Product Development Funnel

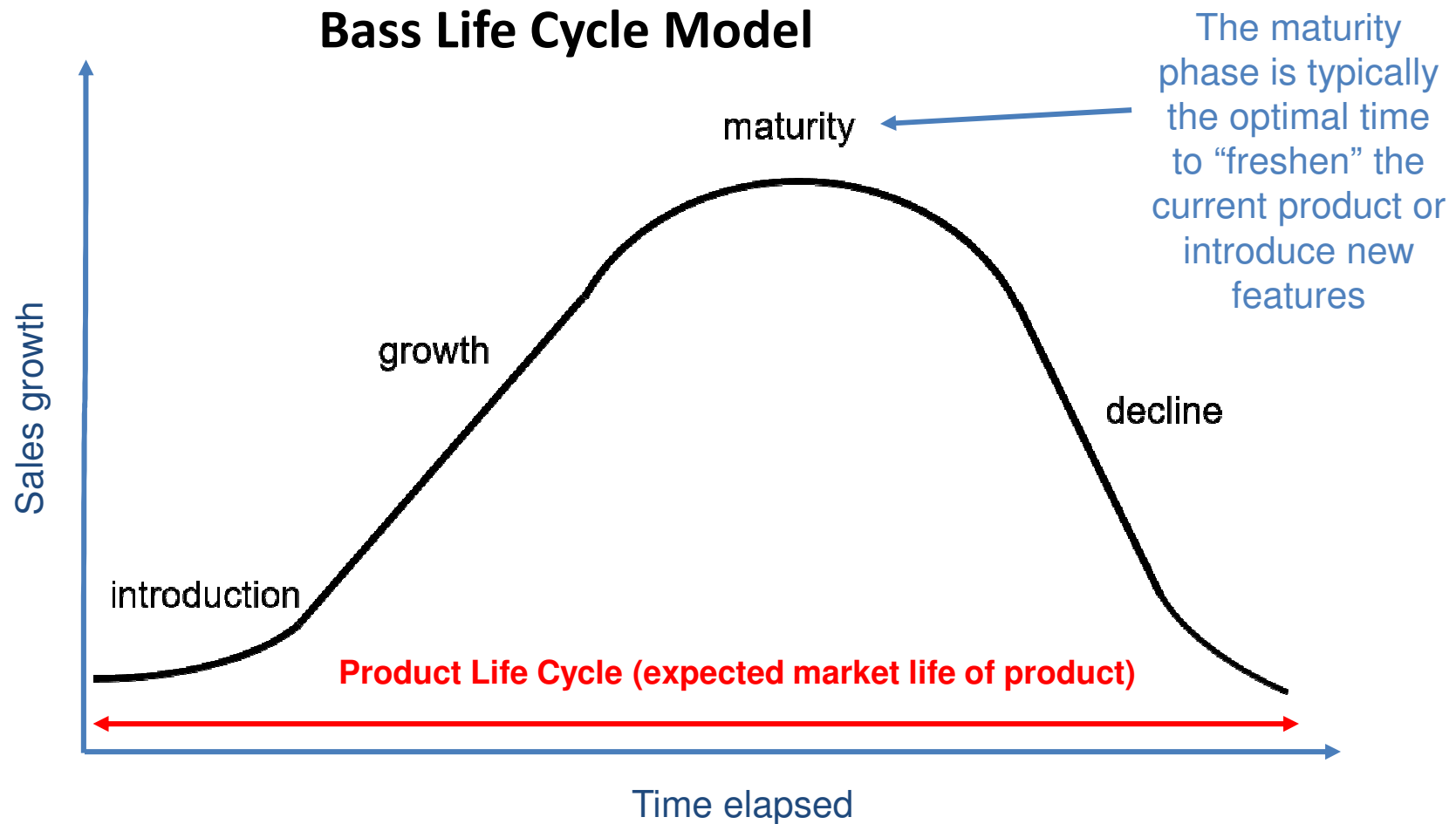
Things we need to know

1. *Many ideas considered in Fuzzy Front End (FFE) of Development*
2. *The Portfolio Management process evaluates ideas for potential ROI, feasibility, opportunities & support*
3. *Ideas become products in laboratory or product development phase*
4. *Lab & Plant produce prototypes for field testing*
5. *Successful field tests are scaled up for product launch and commercialization*



Product Life Cycle

Things we need to know



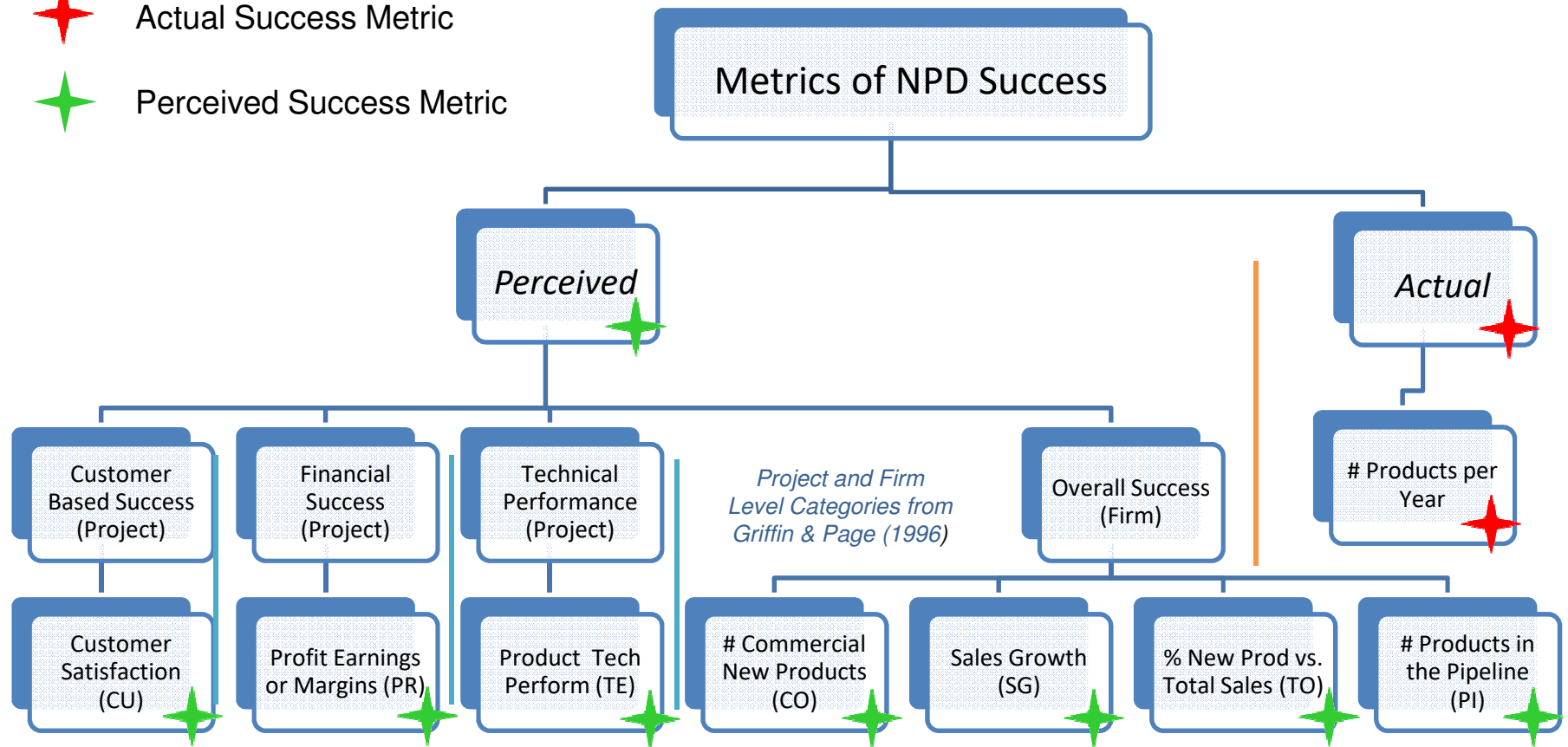
Metrics of NPD Success



Actual Success Metric



Perceived Success Metric



Key performance Indicators

- **Companies Individual Key Performance Indictors**

- % of new products in total sales, % of Sales, % of total sales, % Revenue from new products, % sales / margin from products developed in last 5 years, Annual Sales, checking the boxes, commercialization, conversion of new product tested to new product sold, conversion to commercial products, Customer satisfaction, Customer Satisfaction and Profit, customer satisfaction and sales, Customer acceptance, Customer testimonials, Cycle time, Discussion, Fraction of annual net sales revenue by new products introduced in the past 5 years, percentage of NPD over regular sales, Increased sales. Is it being purchased, key performance indicators, market acceptance, Meeting the criteria stated on the project, Net Present Value of Projects in Pipeline and Launched, New Product % of Total Revenues, New product launch, New product revenue as % of total sales, New products and their sales, NP Sales, Number of commercialized new products (in past year) vs plan, On time, On time and meeting targets, On-time, on-budget, on-cost - we are weak on post launch benefits realization, Percentage New Products in Total Sales, Percentage of new products to total sales, Performance, performance guarantee, Performance to defined Business Plan, Post launch sales, Product sales, profit, Profitability, Profits, Profits and sales, Profits, Return of Investment, Project performance against cost (budget), schedule, and technical, Quality Of Product, Repeat Orders, Revenue from launched products, Revenue from new products, Revenue versus cost, ROI, Sale to a customer, sales, Sales & Profit, Sales after 1 year, Sales and profit, Sales Dollars, Sales dollars after a set period and or distribution achieved, Sales growth, Sales growth, Sales numbers, Sales of New Products, sales profits, Sales Volume, Sales Volume & \$, Sales vs Cost of the NPD, Sales/profit, salesmen complaints, customer service issues on small incremental changes, the ability to have the product adopted into recognized test methods or specifications for larger incremental changes or new products, success with the same product at multiple sites/applications, technical performance and customer satisfaction, Timeline, Timing and cost, unit sales, vitality index, Win-Win Customer Satisfaction and Profitability
- **Bottom Line: there are many specific individual company indicators**

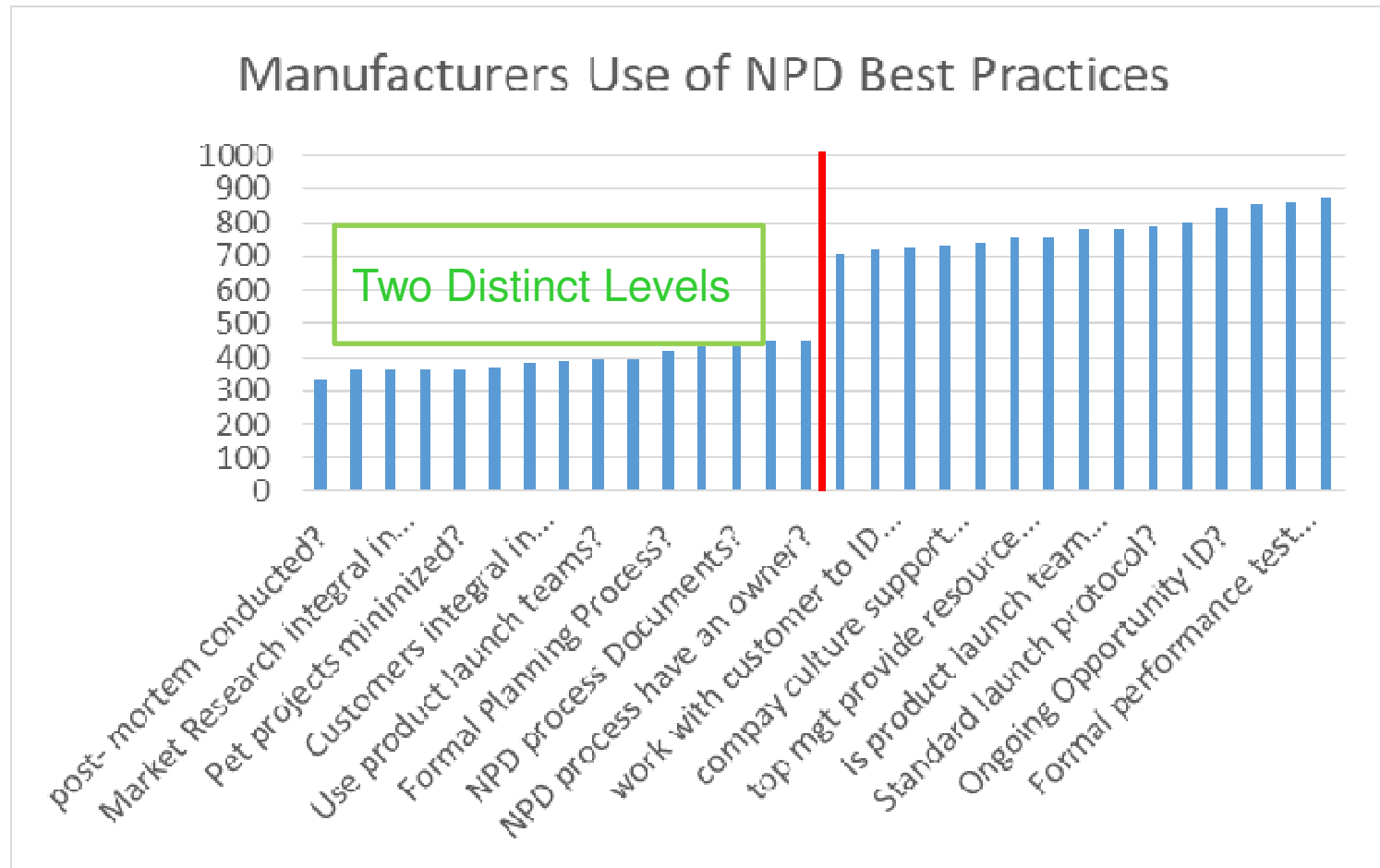
Best Practices: These is the key!



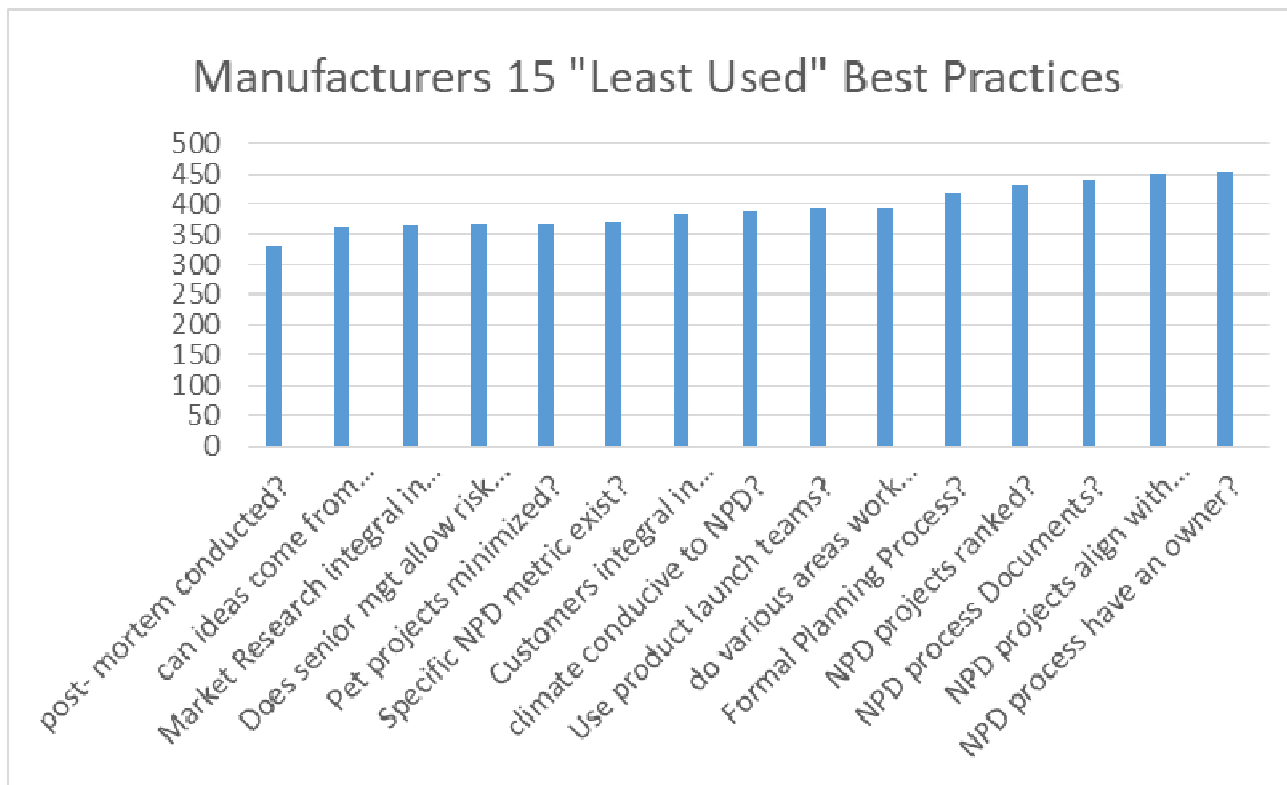
Dimensions of NPD Best Practices – taken from the Delphi method panel

Strategy 18%	Strategy - identification, prioritization, selection, and resource support of preferred projects.
Research 16%	Research - techniques to sense, learn, and understand customers, competitors, and forces in the marketplace.
Commercialization 15%	Commercialization - marketing, launch, and post-launch management of new products that stimulate customer adoption and market diffusion.
Process 15%	NPD Process - the implementation of product development stages and gates for moving products from concept to launch
Project Climate 13%	Project Climate - the means and ways to establish product development intra-company integration at the individual and team levels.
Company Culture 13%	Company Culture - the company management value system, including customers and suppliers.
Metrics Performance 10%	Metrics and Performance Measurement - measurement, tracking, and reporting of product development program performance.

Manufacturers Use of Best Practices



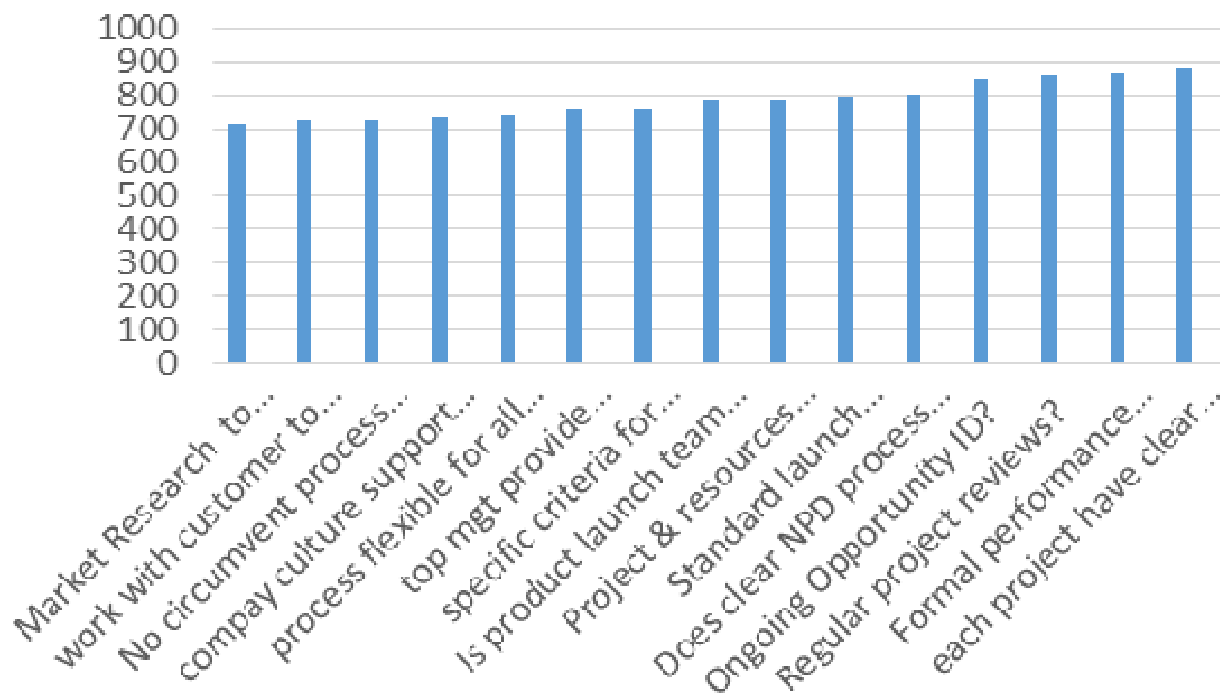
Least Used Best Practices



- Post-Mortem conducted?
- Can ideas come from outside?
- Market research integral in NPD?
- Does Senior Mgt allow risk taking?
- Pet projects minimized?
- Specific NPD metrics exist?
- Customers integral in process?
- Climate conducive to NPD?
- Use product launch teams?
- Do various areas work together?

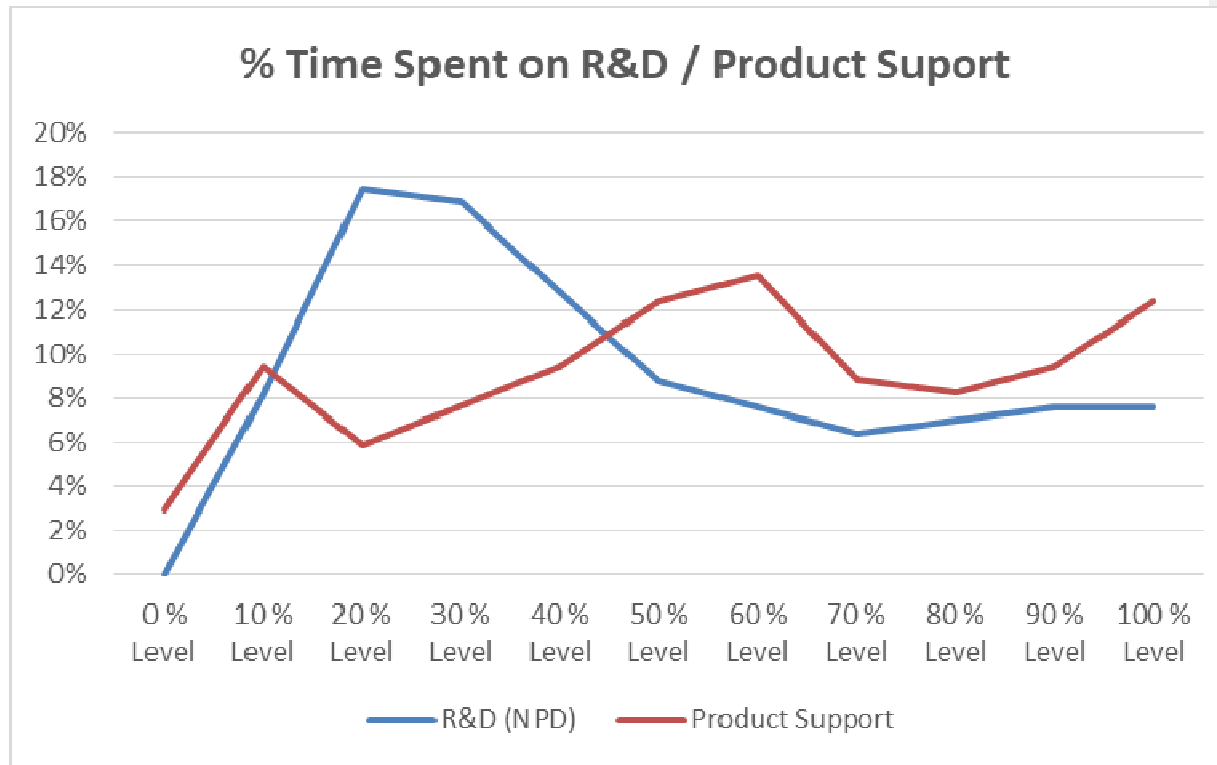
Most Used Best Practices

Manufacturers 15 "Most Often Used"
Best Practices



- Top management provide resource to support?
- Specific criteria for evaluating projects?
- Is product launch team cross-functional?
- Project & resources balanced?
- Standard launch protocol?
- Does clear NPD process exist?
- Ongoing opportunity ID?
- Regular project reviews?
- Formal performance test evaluations?
- Each project have clear leader?

Survey Results: % Time spent on R&D

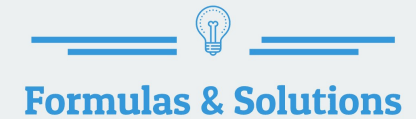


This is an overlay of two survey questions

- What percent of your time is spent on R&D?
- What percent of your time is spent on product support?

People in R&D frequently spend a portion of their time also supporting products

Summary of NACM-BPS Research



- 85% of innovation is incremental/more innovative (BPS rules apply;
 - 15% of innovative is radical (many rules do not apply
- Large companies have more people and more individual departments
 - This allows them to dedicate persons to innovation or deep innovation
- Many large companies Strategic Business Units resemble SME's.
 - SME's have a fewer people with more job responsibility overlap
- Clear project leaders/owners/sponsors/champions helps
- Regular reviews and cross functional teams encourage NPD success
- Companies need formal portfolio selection process, metrics, and reviews according to the company's culture, goals, and strategy.
- Innovation includes failure -- some risks should be encouraged
- Learn to review past experiences and apply corrections to future projects

Conclusion: Acknowledgement

Thank you to:

the many NACM-BPS survey participants,
my family and friends for their support
Lawrence Tech University - COBIT

If interested in additional information, please contact me at

ejonschnellbacher@formulas.solutions

Additional information available on my website at *appreciativeinnovation.org*
And on *STLE.org* (as permitted)

Special Thanks to Gloria Barczak & Ken Kahn for permission to modify their original survey. “**Identifying New Product Development Best Practice.**”
by: Barczak, G., & Kahn, K.B. (2012). *Business Horizons*, 55(3), 293-305.



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- 32 years between 4 BPS
 - 1990-2022 fairly stable trends
- 59% overall success rate
 - largely unchanged over time
- Extensive survey identified:
 - Best Practices, many identified
 - Success/Failure factors, many
 - NPD/Innovation Processes
 - Fuzzy Front End & Engineer Design
 - Frequency of Level of Innovation
 - Strategies employed
 - Use of Technology & Org Tools
 - Marketing Strategies, Market Research
 - Product Development Outcomes
 - Demographics of Firms
 - Characterized “Best” vs. “the Rest”

Best vs Rest: Success Rates

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The Innovation Process (NPD Stage-Gate®)

Things we need to know

Project Specifications are reviewed at Gates before each Development Stage.

