November 2005

booz&co.

Money Doesn't Buy Results

Booz & Company Global Innovation 1000 Study

The Booz & Company Global Innovation 1000

Best Practices From the Most Effective Innovators

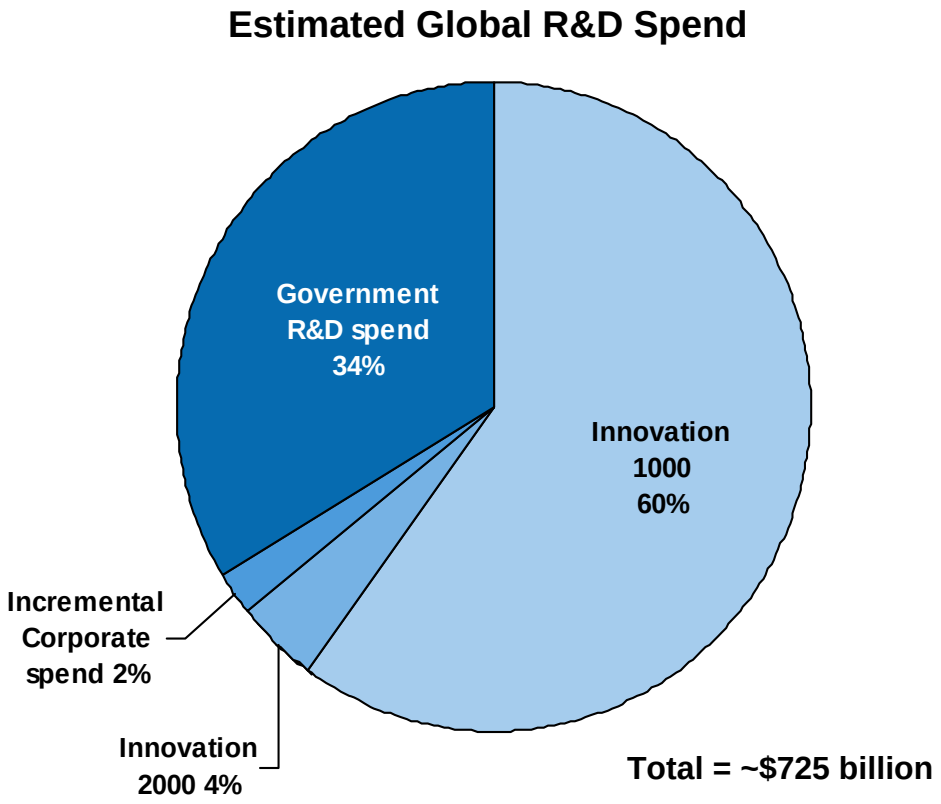
In late 2005, we completed the Global Innovation 1000 study, assessing the relationship of R&D investment to performance

Booz & Company Global Innovation 1000

- 1,000 largest R&D spenders in the world

Study Goals

- Understand linkage between R&D spending and corporate performance
- Continue our research into how firms can maximize their innovation investment
- Highlight specific examples of effective innovators & identify key success factors
- Highlight regional and industry differences in the role & impact of R&D investment
- By revisiting annually, understand how factors change over time



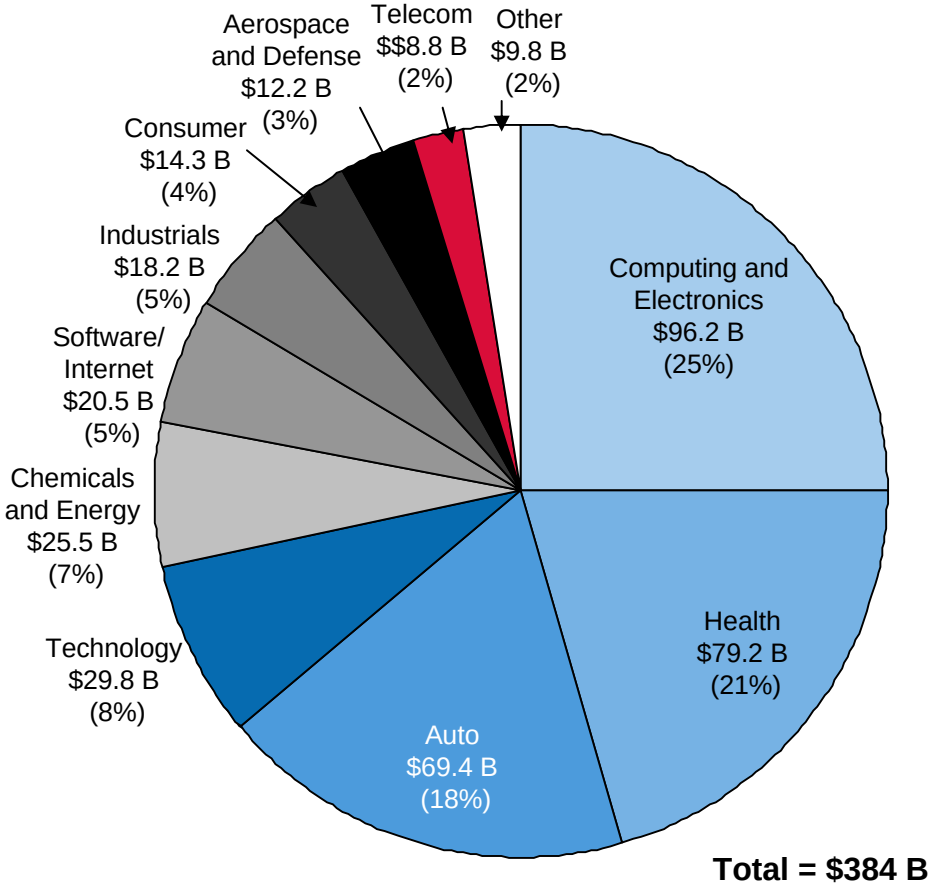
Our study captures 80%-90% of corporate spending and ~60% of total Global R&D

Note: Incremental corporate spend estimated using geometric progression

Source: Booz & Company analysis

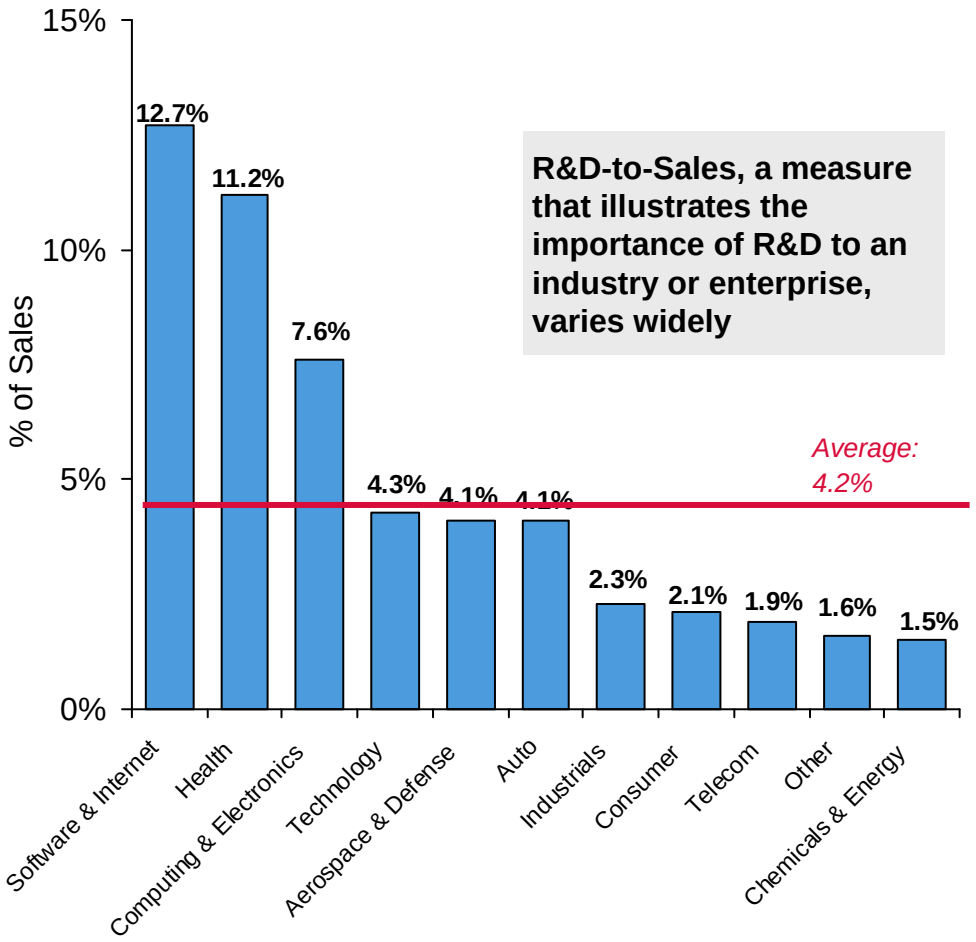
The industry profile of the Global Innovation 1000 shows spending highly concentrated in Tech, Health and Automotive sectors

R&D Distribution by Industry: 2005



Total = $384 B

R&D % of Sales by Industry: 2004

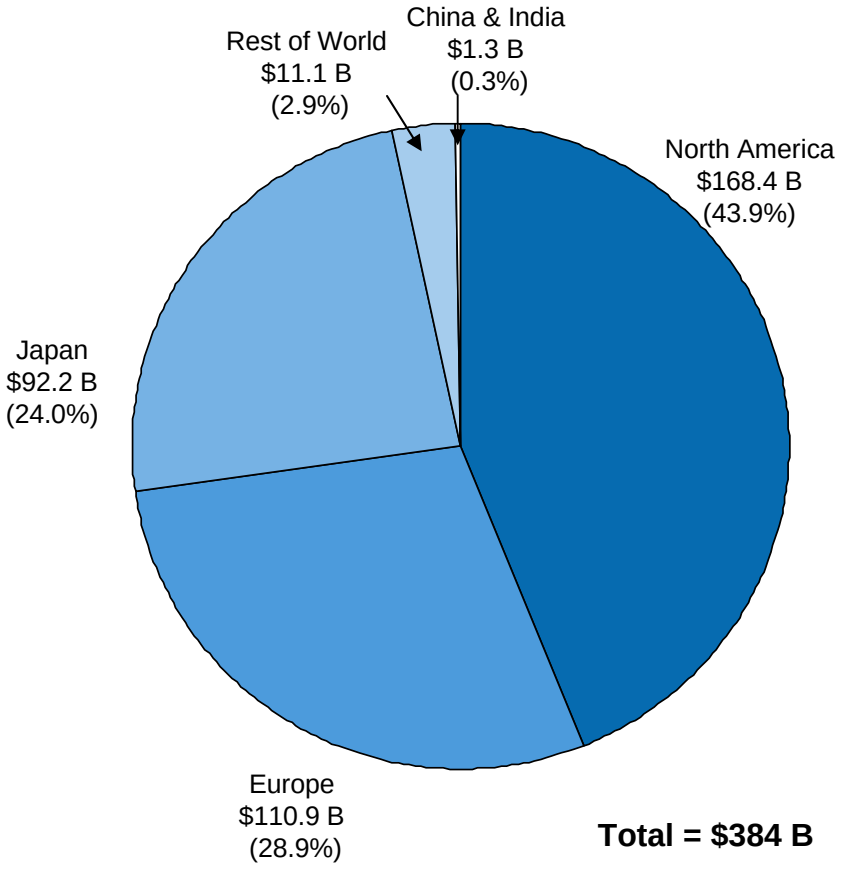


R&D-to-Sales, a measure that illustrates the importance of R&D to an industry or enterprise, varies widely

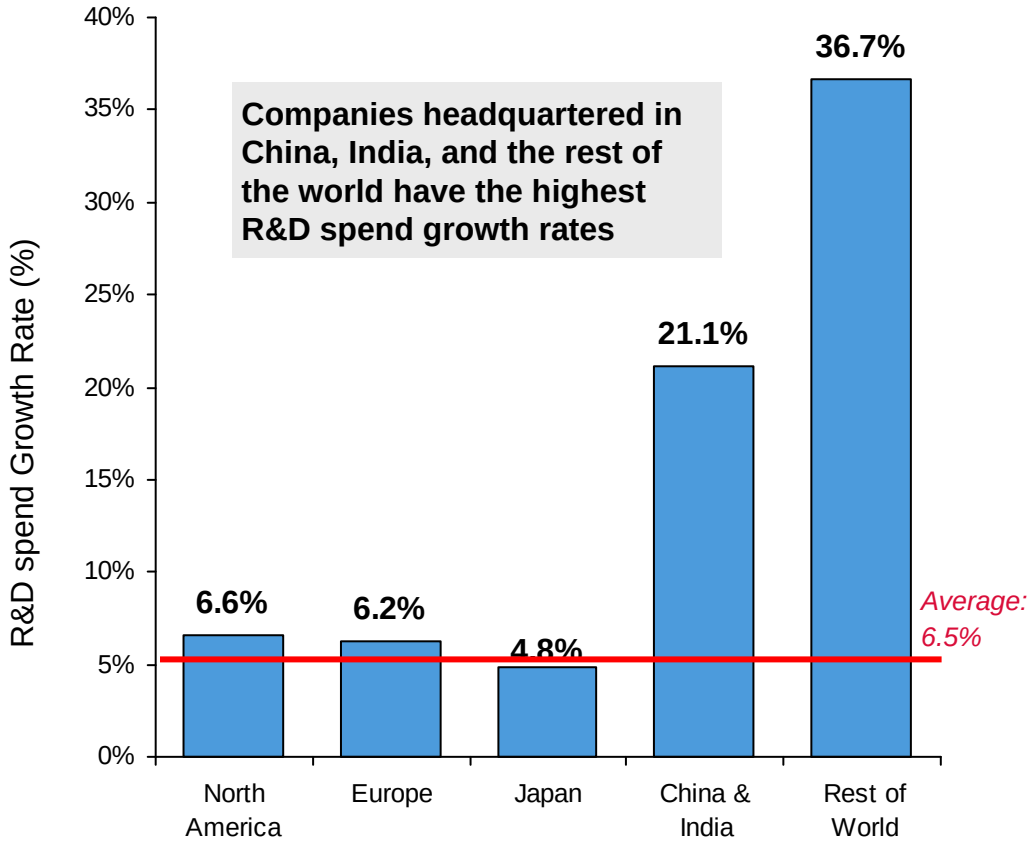
Source: Booz & Company Global Innovation 1000

Companies headquartered in North America, Europe, and Japan account for nearly 97% of the global R&D spend

R&D Distribution by Region: 2004



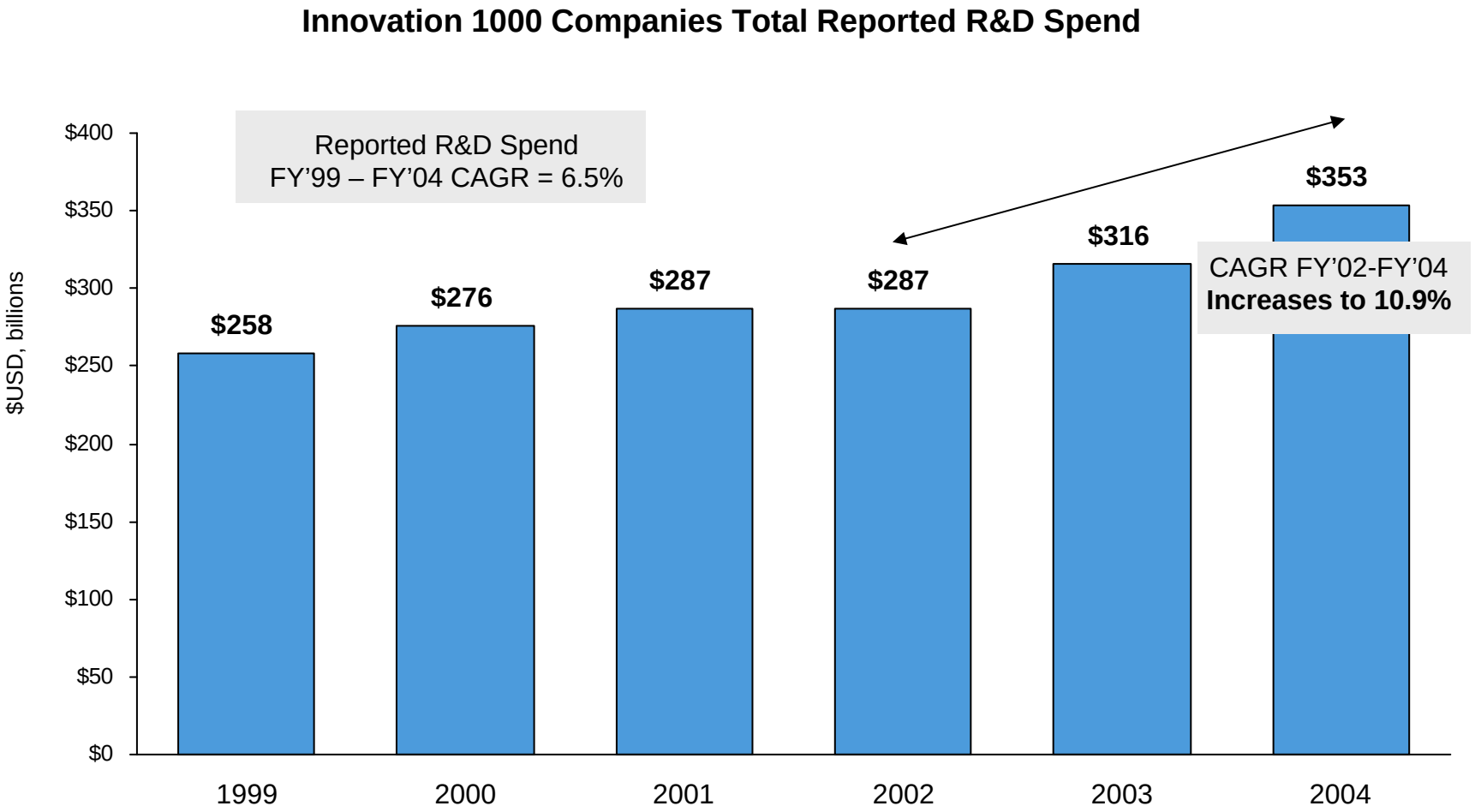
R&D Spend Growth: 1999-2004



Note: Geographic designation reflects location of HQ for each company and may not reflect the true scope of a company's R&D network; ROW includes _____

Source: Booz & Company Global Innovation 1000

R&D spending is on the rise, the result of increased competition and product complexity and faster cycle times



Note: Only includes the 872 companies with data available for all 6 years the Booz & Company Global Innovation 1000 covered

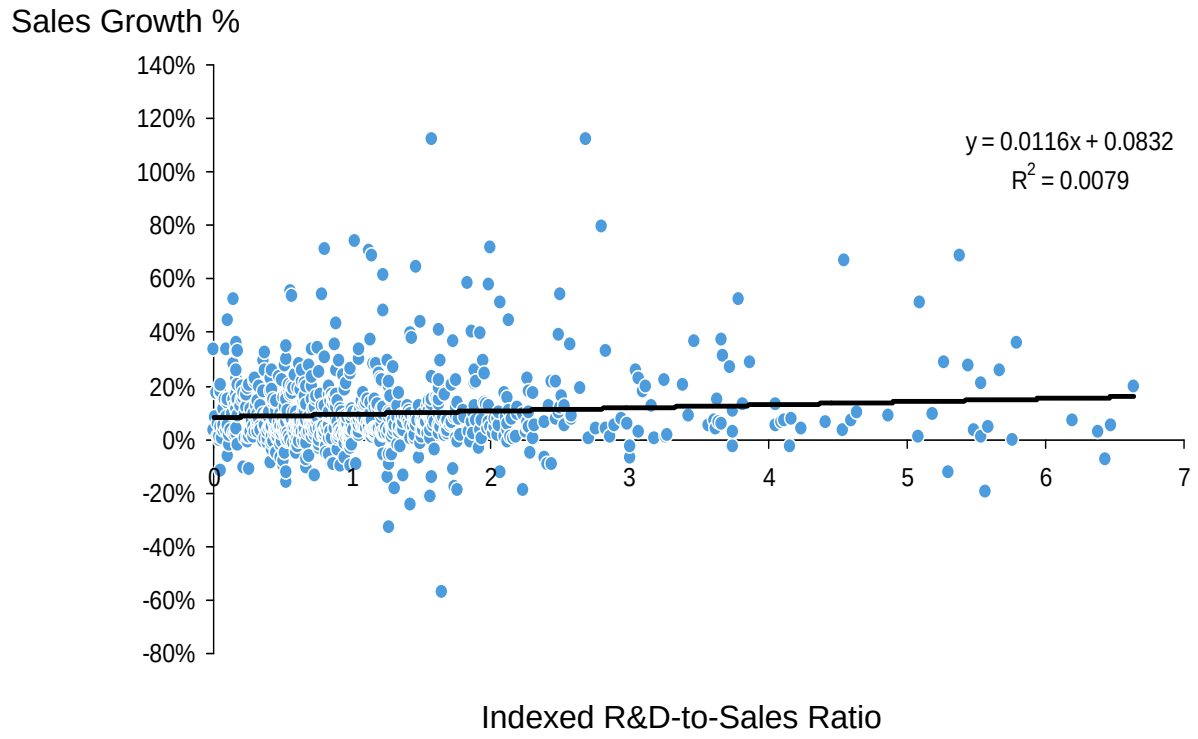
Source: Booz & Company Global Innovation 1000

However, higher R&D spending does not ensure higher financial performance

No correlation was found through 495 analyses when comparing R&D measures* with:

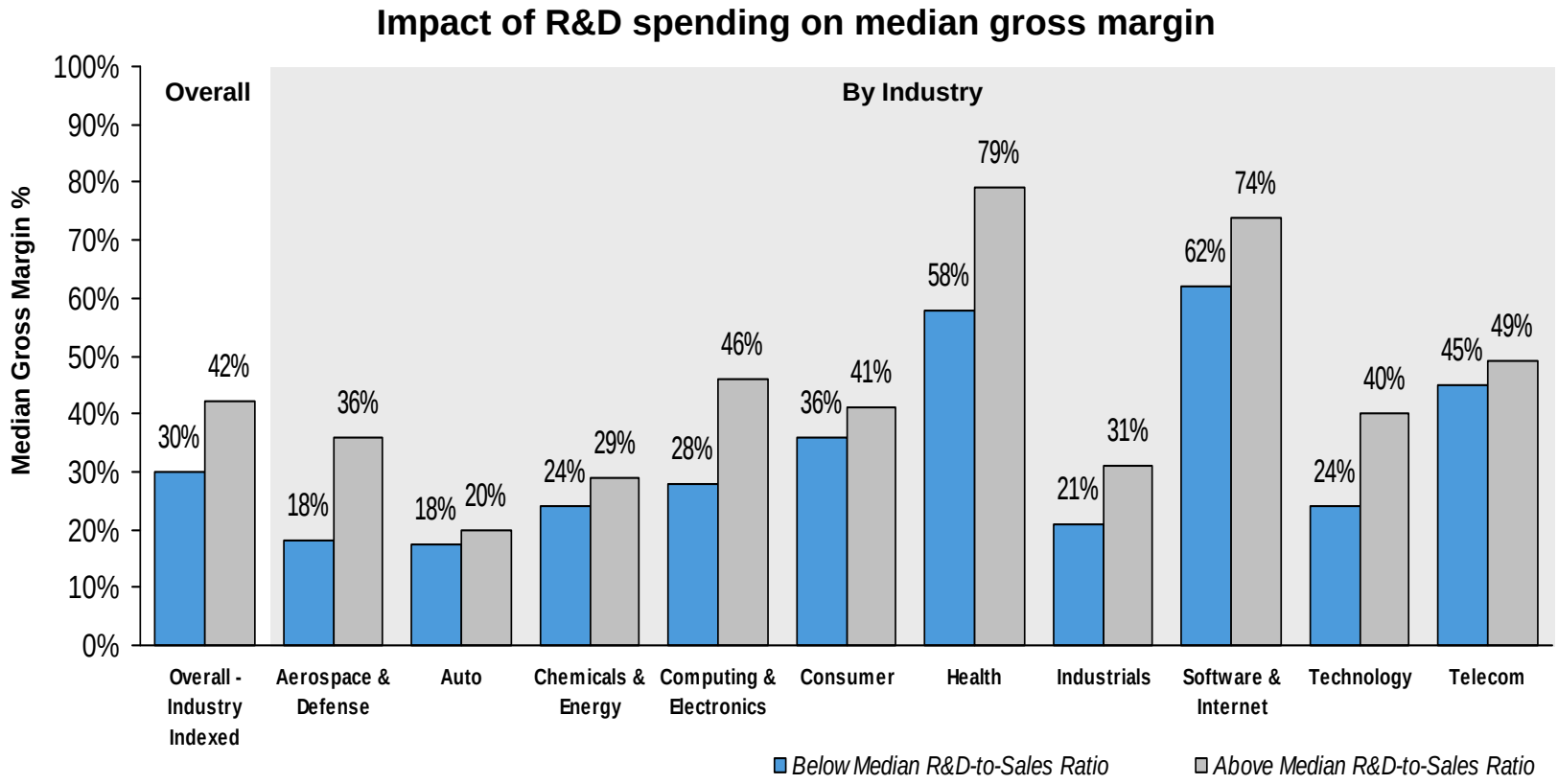
- **Sales growth**
- **Profitability growth**
- **Gross profit**
- **Operating profit**
- **Net profit**
- **Market cap growth**
- **Total shareholder return**

The Performance Disconnect
Example analysis showing relation between R&D and financial performance



Note: The example graph shows no correlation between our primary metric for R&D (industry indexed R&D to sales ration) for 1999 and sales growth from 1999-2004
* R&D measures used as Performance Dependant Variables included R&D-to-Sales, R&D growth rate, and the ratio of R&D and CapEx combined to Sales
Source: Booz & Company Global Innovation 1000

The only uncovered relationship, between gross margin and R&D spending, shows higher spending can lead to a "better mousetrap"



Successful innovators not only create improved products, but are also better able to capitalize on them in the market

Source: Booz & Company Global Innovation 1000

Our recent Global Innovation 1000 study also showed three other key learnings regarding R&D

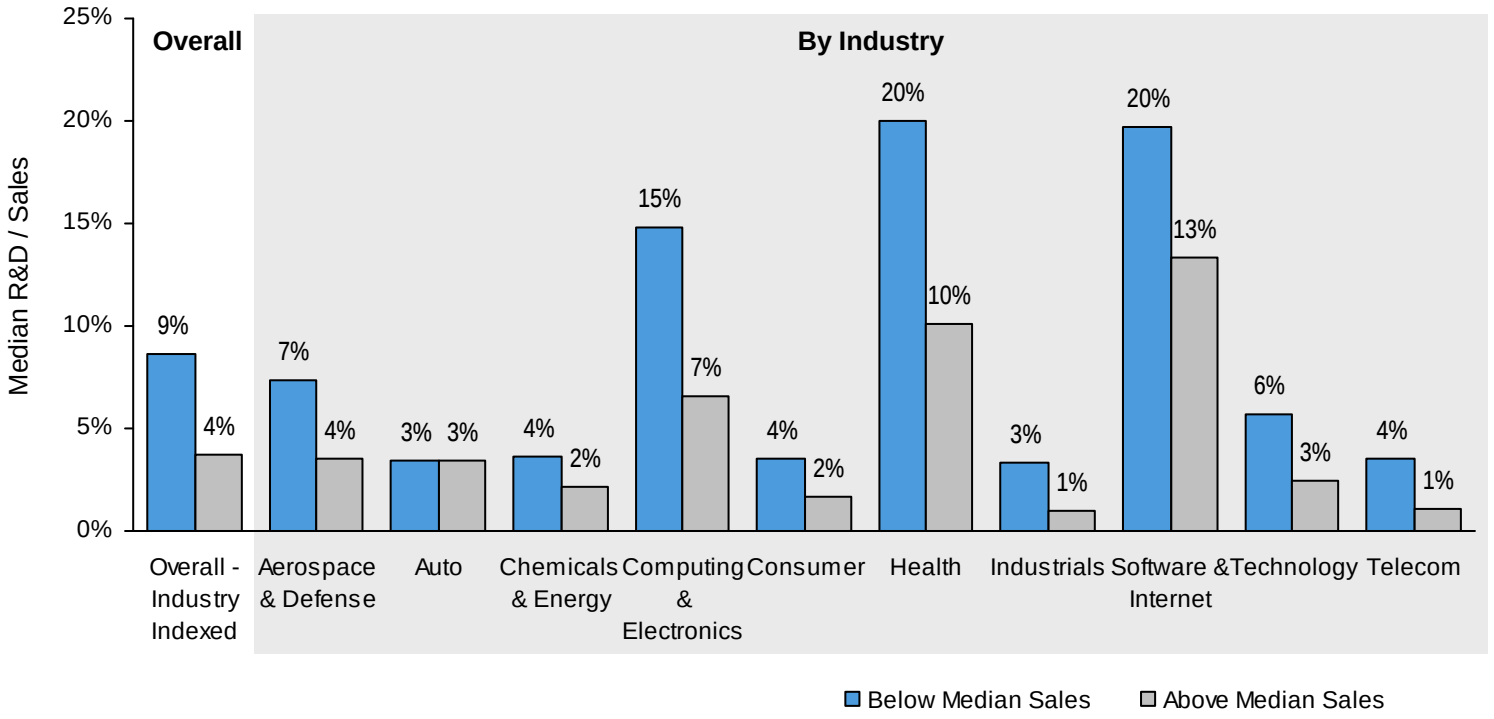
Money Doesn't Buy Results	There is no relationship between R&D spending and the primary measures of economic or corporate success, such as growth, enterprise profitability, and shareholder return
Size Matters	Larger organizations can spend a smaller proportion of revenue on R&D than can smaller organizations, and take no discernible performance hit
You Can Be Too Rich Or Too Thin	Spending more does not necessarily help, but spending too little will hurt
No Clarity On Optimal Spend Level	Instead of clustering into any coherent pattern, R&D budget levels vary substantially, even within industries, which suggest that no single approach is universally recognized as the most effective

The scale effect does exist in R&D spending – larger companies spend a smaller % of sales on R&D

Smaller companies can overcome the scale effect by spending R&D dollars more efficiently.

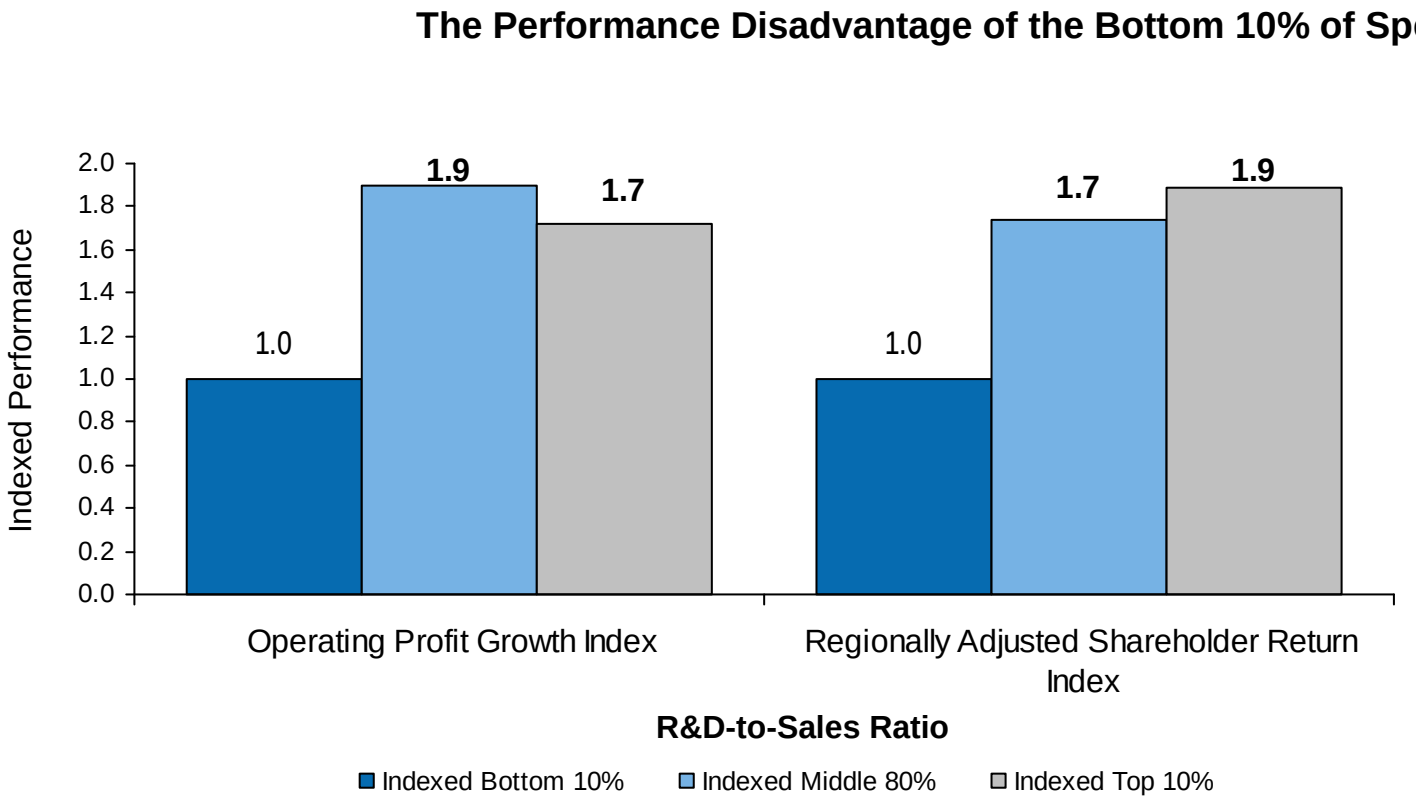
Examples:

- **Open innovation**
- **Low cost R&D network notes**
- **Broader use of partnerships**



Source: Booz & Company Global Innovation 1000

While we've shown R&D doesn't drive performance, don't cut that budget – you can be "too rich" or "too thin"

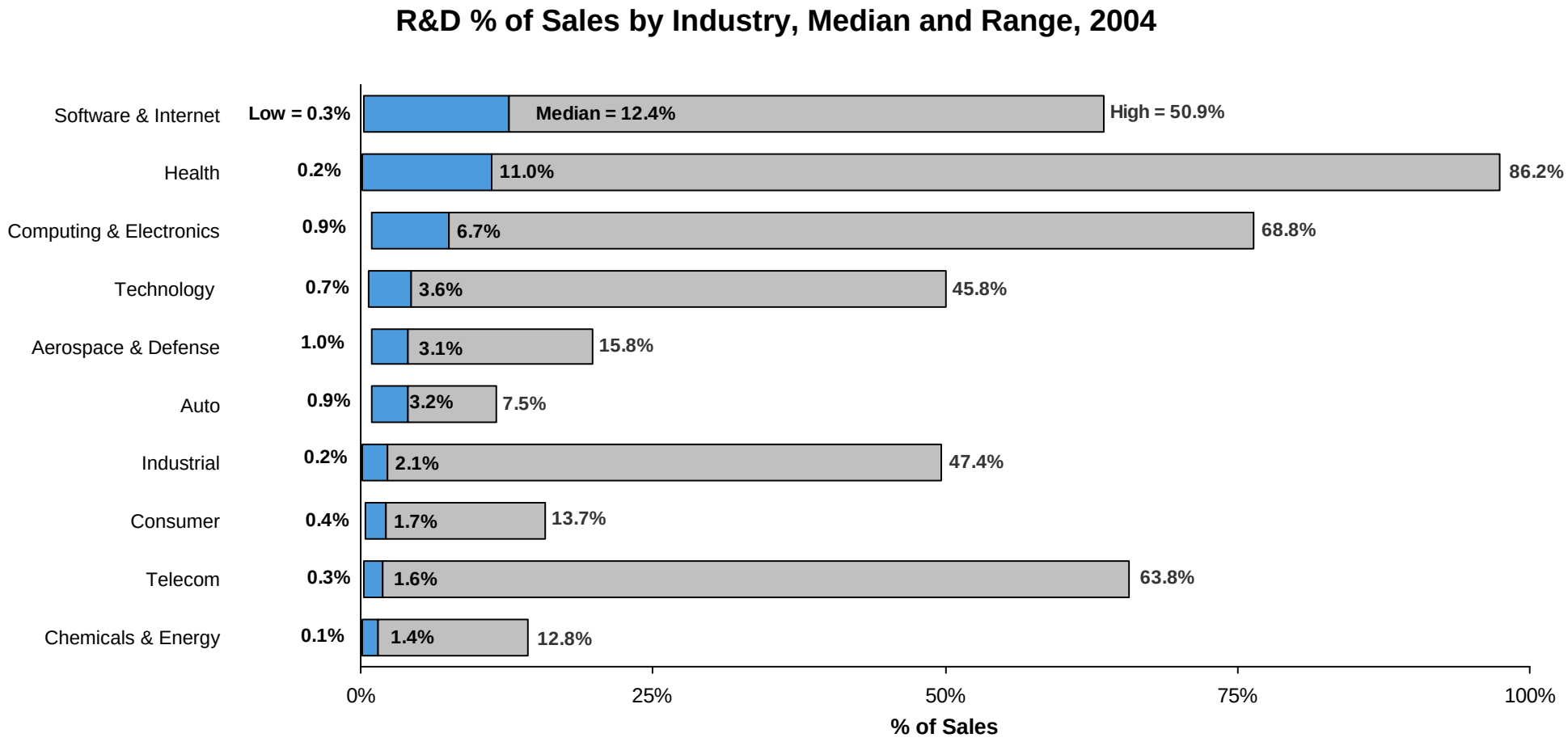


- Spending much less that industry median **does** lead to consistently lower performance
- Spending much more than industry median does **not** drive consistently better performance

Note: R&D-to-sales ratio indexed by industry across all 1,000 companies; performance measures indexed by industry across all 1,000 companies; performance measure comparisons indexed based on setting median performance for bottom 10% at 1.00

Source: Booz & Company Global Innovation 1000

While different industries clearly spend different levels on R&D, there is no consensus on the right level



Note = R&D-to-Sales ratios larger than 100%, typically indicating a start-up company, were excluded from this analysis
Source: Booz & Company Global Innovation 1000

The Booz & Company Global Innovation 1000

Best Practices From the Most Effective Innovators

The most effective innovators do four things well

Align Innovation Strategy with Corporate Strategy	When this alignment takes place, all functional silos have incentives to support corporate and innovation strategies
Make the Right Bets	This imperative requires managing not only the portfolio of projects and technologies that will maximize tomorrow's profits, but also the portfolio of business models needed to bring them to market
Manage the R&D Pipeline with Speed & Efficiency	It is critical to have clear processes both to manage the innovation effort (e.g., program management standards) and to support it (e.g., knowledge management)
Ensure your "Innovation OrgDNA" is healthy	Because entities with healthy organizational DNA profiles significantly outperformed those with dysfunctions ones, companies and R&D departments need to take steps to ensure healthy OrgDNA

Align Innovation Strategy with Corporate Strategy

Make the Right Bets

Manage the Pipeline with Speed & Efficiency

Ensure your "Innovation OrgDNA" is Healthy

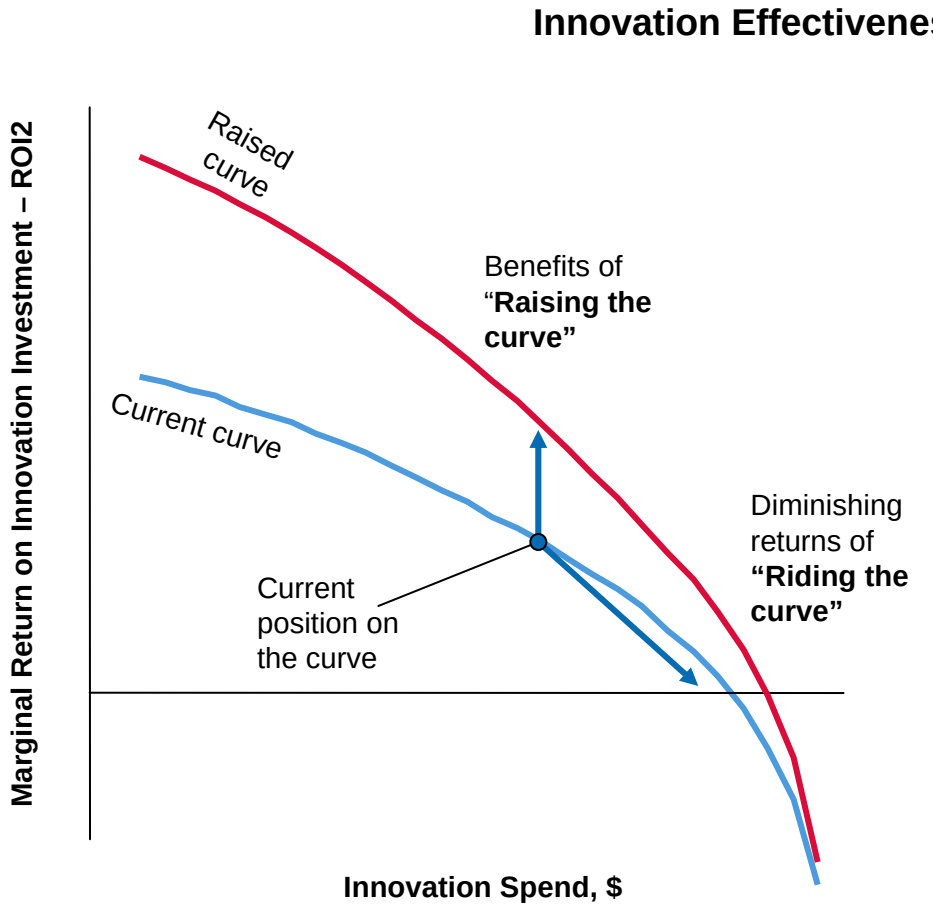
Align Innovation Strategy with Corporate Strategy

Make the Right Bets

Manage the Pipeline with Speed & Efficiency

Ensure your “Innovation OrgDNA” is Healthy

Achieving higher growth through new product innovation requires companies to raise the innovation effectiveness curve



Raising the curve

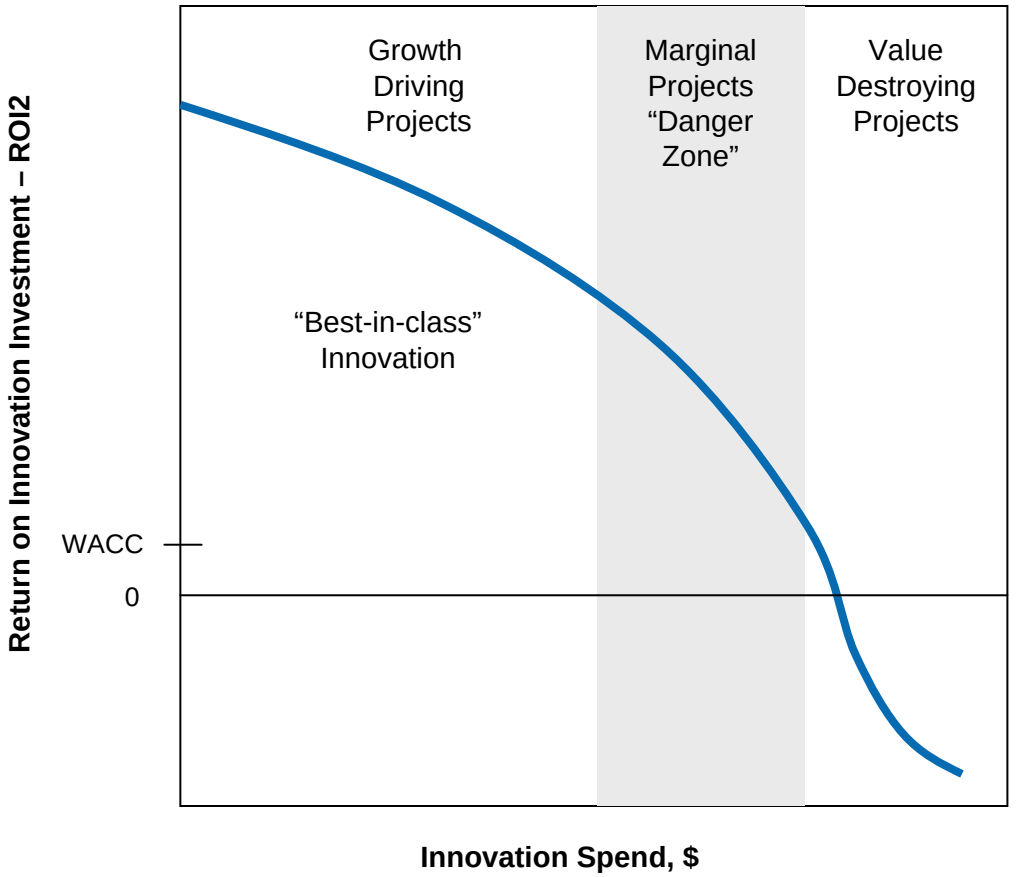
- Increased Innovation Effectiveness
- Profitable growth

Riding the curve

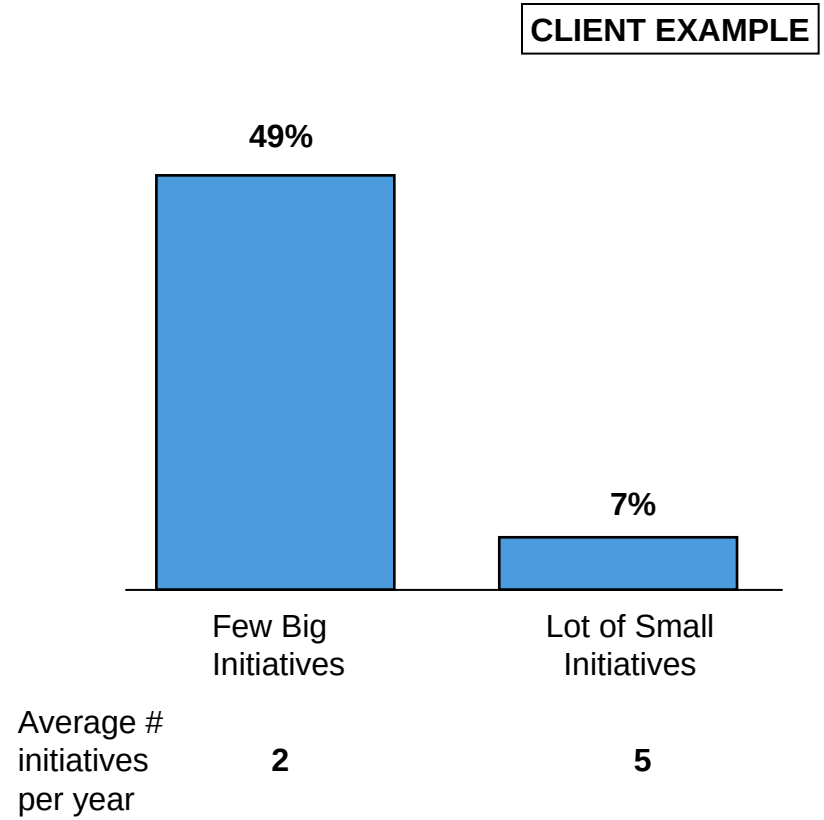
- Increased innovation spend
- Diminishing returns

Focus on high impact initiatives is important – lots of little projects often don't add up

Danger Zone on Innovation Effectiveness Curve



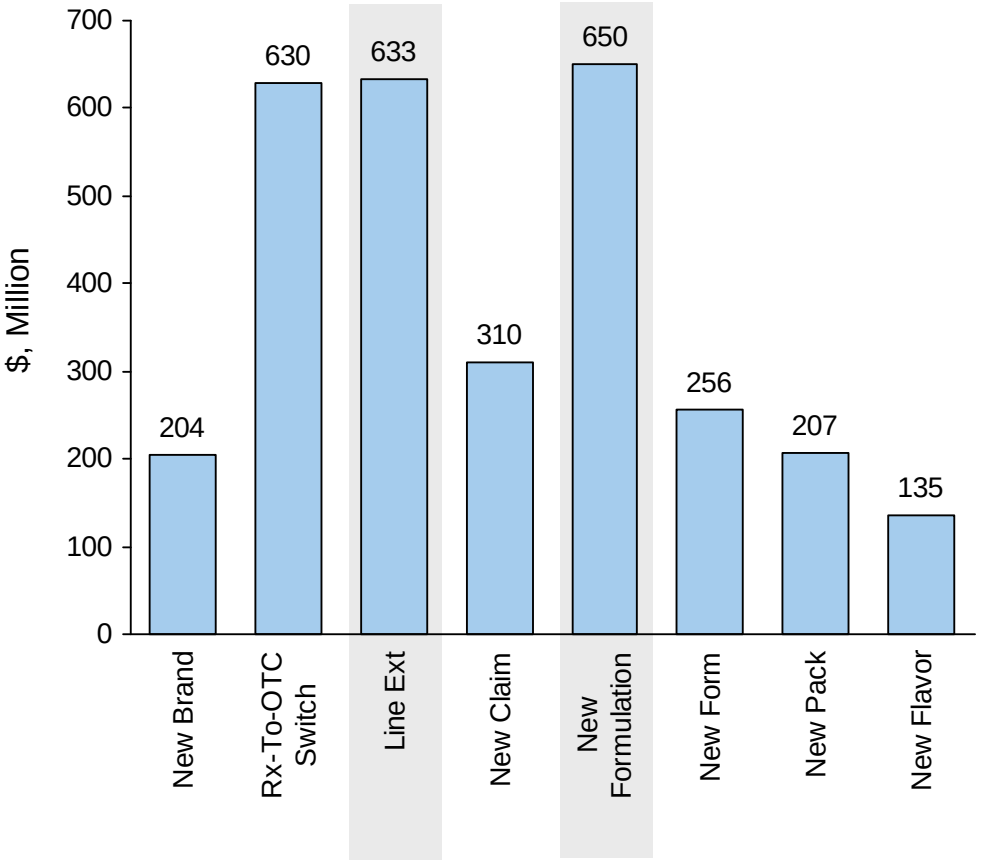
Average Growth Over 7 Years



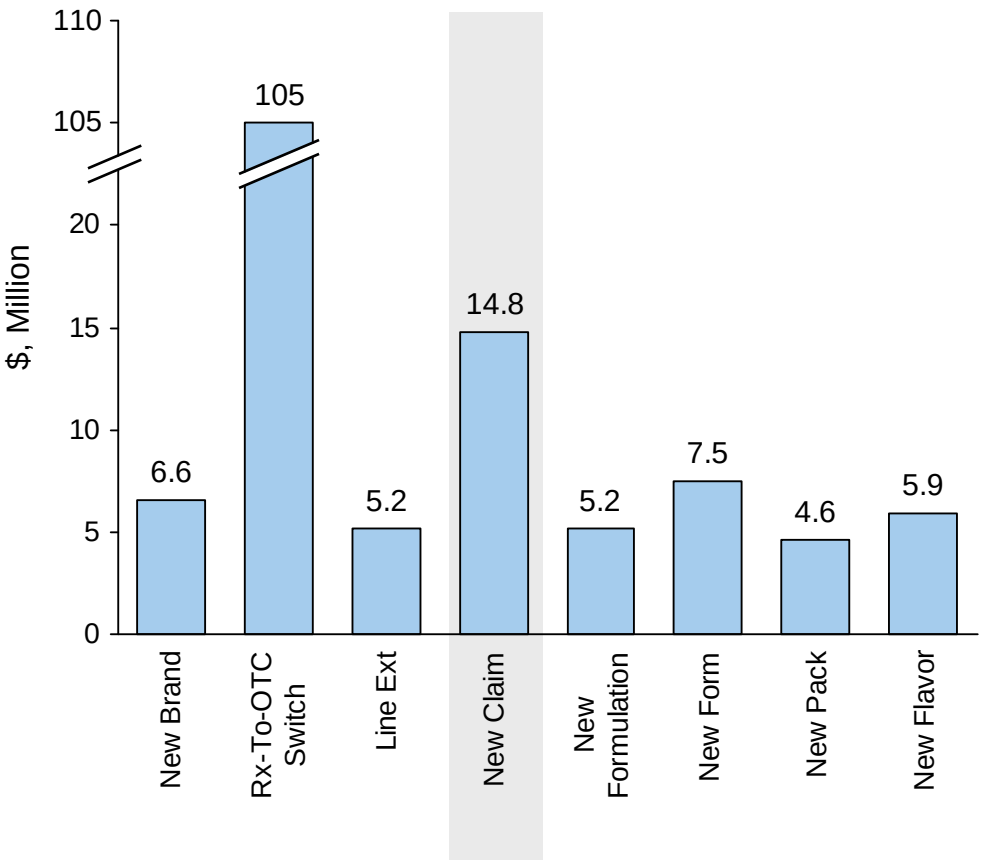
Different types of new products may have very different success and growth potential

CLIENT EXAMPLE

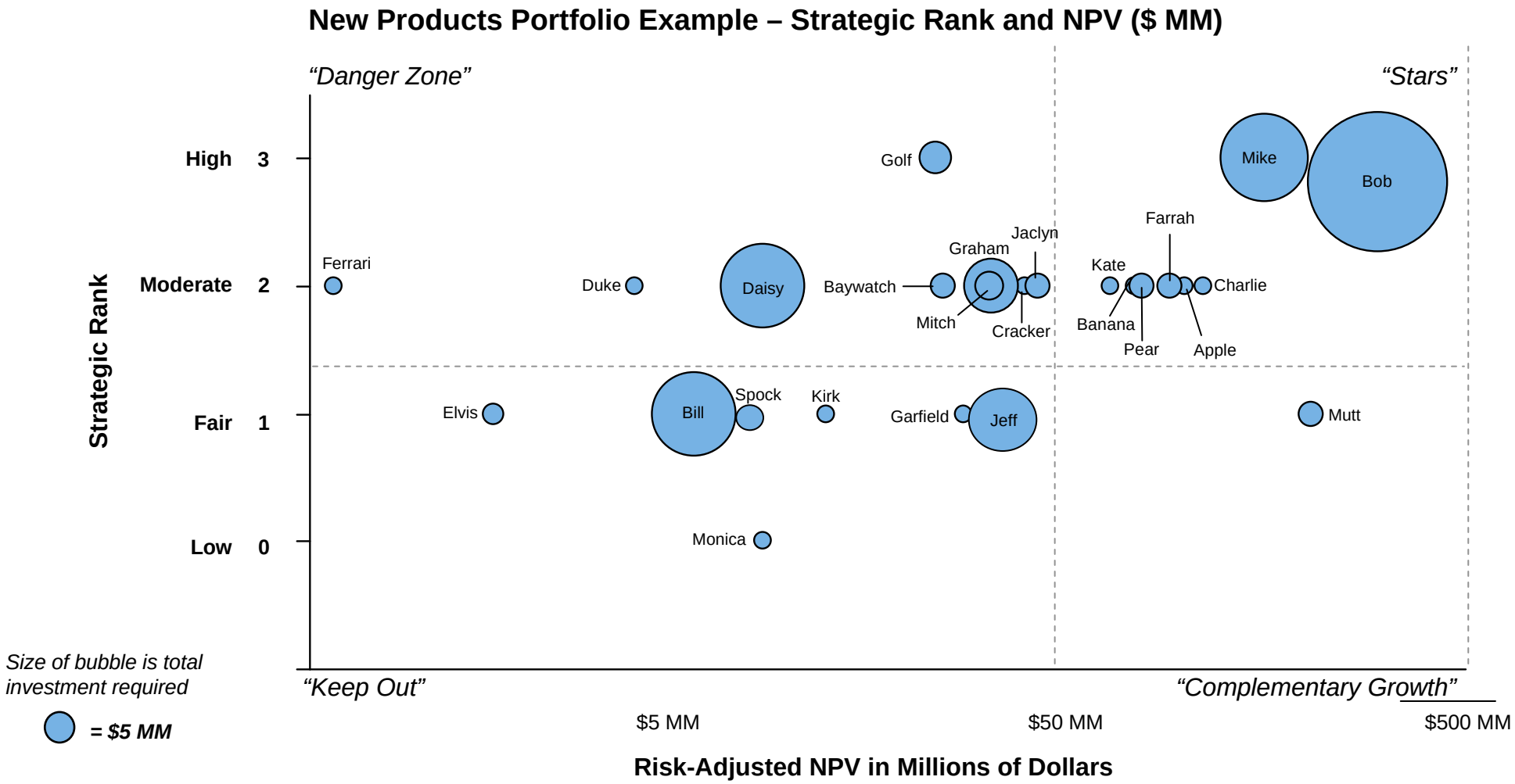
New Product Sales (2nd year)



Average New Product Sales (2nd year)



Projects' strategic and economic value can be mapped to provide important insights into the portfolio



Within the opportunity areas, an appropriate innovation strategy must be determined

Innovation Strategy Segmentation

Innovation Approach

R&D-Driven ("Technology Forward")

Market-Driven ("Market Back")

The Skunk Works

Create breakthrough products – then put them out there and see which stick

Growth Impact

- Rely on early adopters, techno- and fashion-geeks; word of mouth and niche marketing
- **Examples:** Bose, Mizuno running shoes, Razor scooter

The Market Maker

Make a product – then make a market

Growth Impact

- Focus on aspirational "wants" rather than product-specific "needs"
- Creating a strong brand umbrella is important
- **Examples:** Nike, L'Oreal, Calvin Klein, Apple

The Follower

Copy whatever the market leaders are doing

Growth Impact

- **Examples:** Pepsi Cola (e.g., Pepsi Twist), Av[illegible], Kia cars

The Listener

Find a consumer need – then make a product

Growth Impact

- Focus on product-specific "needs" rather than aspirational "wants"
- **Examples:** Lexus, Dell, P&G, Coca-Cola

None / Passive — Active / Aggressive

Consumer Insight Approach

Align Innovation Strategy with Corporate Strategy

Make the Right Bets

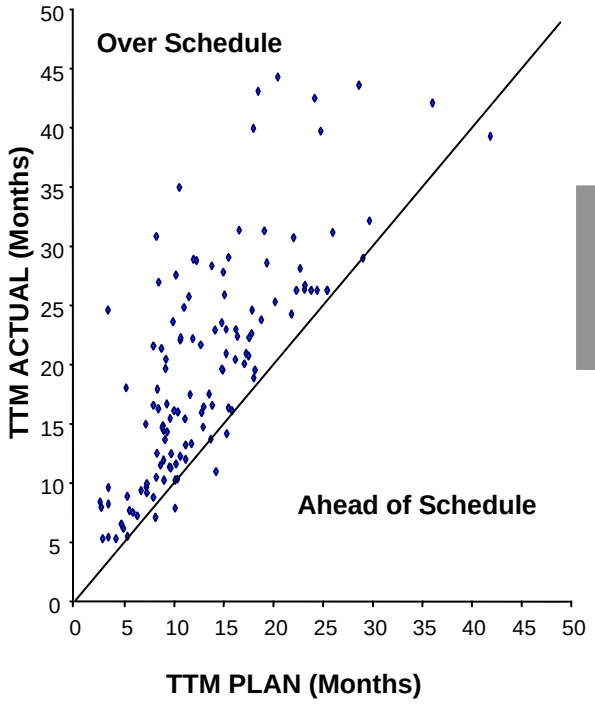
Manage the Pipeline with Speed & Efficiency

Ensure your "Innovation OrgDNA" is Healthy

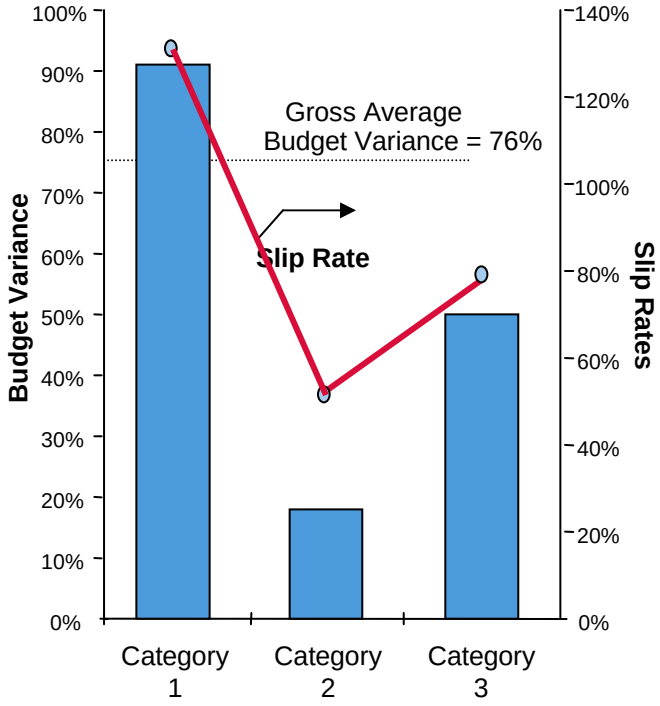
Fast time-to-market reduces product development cost and significantly improves competitiveness

Time-to-Market (TTM)
Actual vs. Planned

CLIENT EXAMPLE



Project Budget Variance



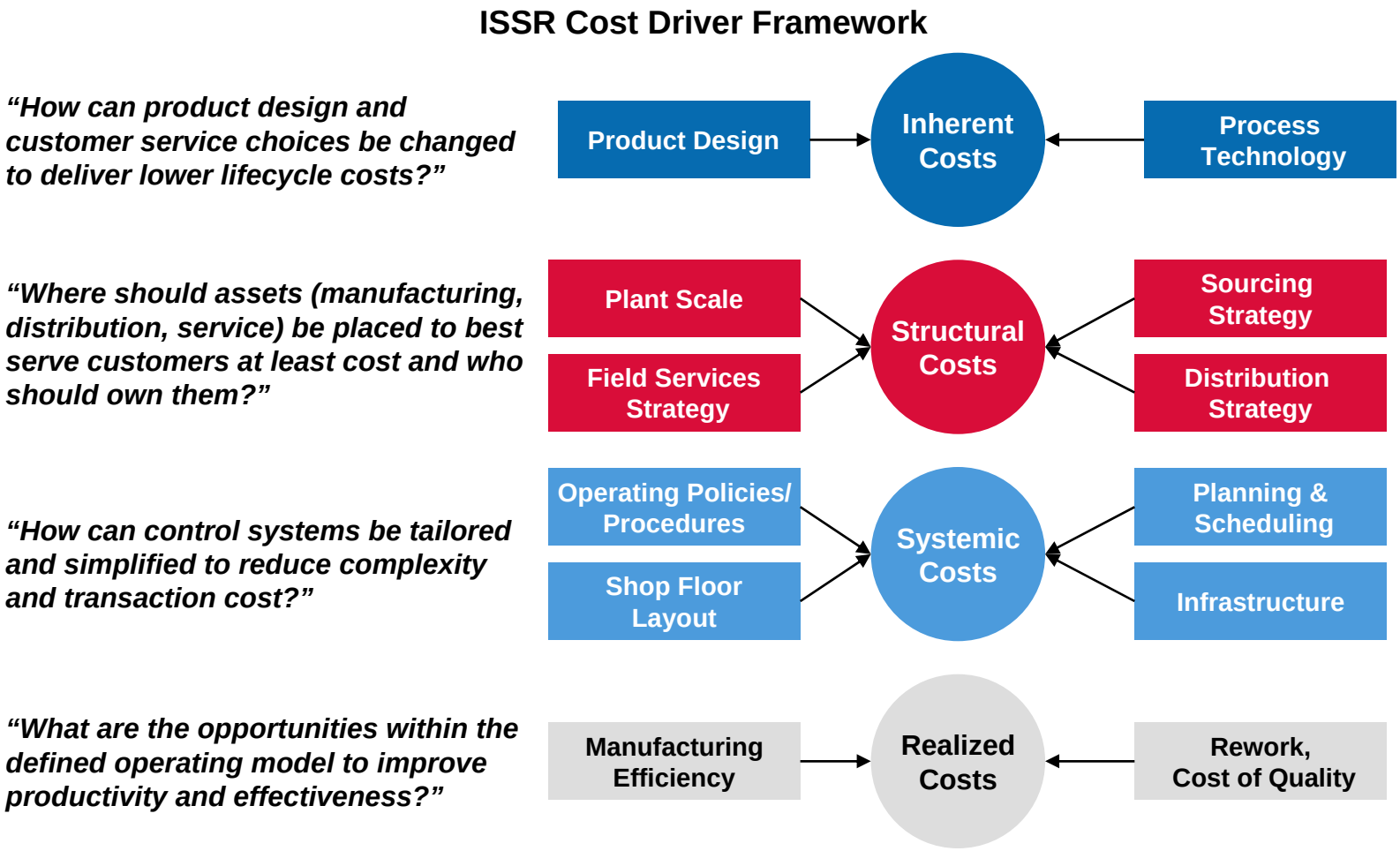
Competitive Advantage

Competitor's Product B

Our Product A	Launch	Don't Launch
Launch	*B is 1st* **$31 MM** / **$198 MM** *A is 1st*	**$428 MM**
Don't Launch	**–$20 MM**	**$0**

$ MM's are PV of scenario
to Booz & Company's client

Design choices impact product and supply chain cost / complexity at a variety of levels (ISSR)



Decomposing the real drivers of cost provides insights to areas of potential focus…

Cost Driver Model: Product X

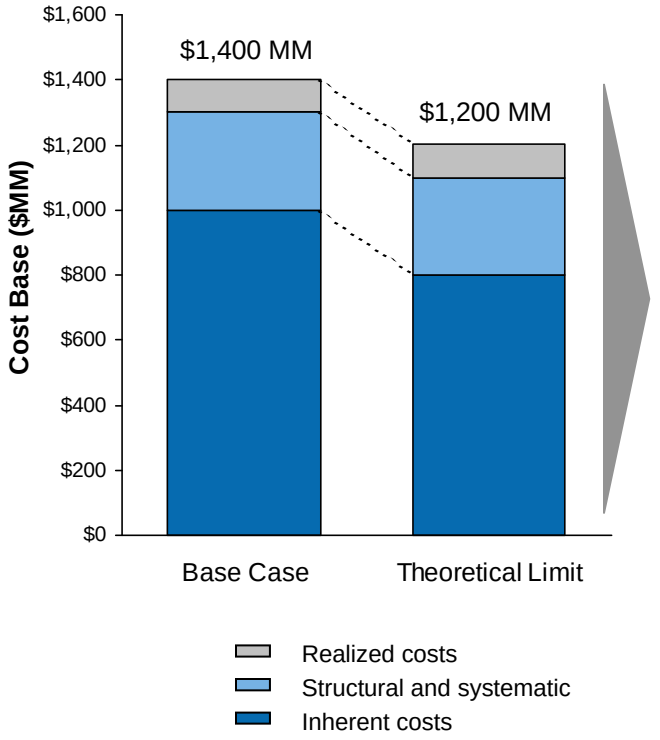
				Maximum % of Cost Bucket Impacted												
		$MM	% of Total	Conversion Technology	Cust. / Cons. Performance Requirement	Design Complexity	Distance	Factor Costs	Inventory Level	Mode of Transport	Scale	Scrap	Special Handling Requirement	Usage per Utilization	Utilization	Volume
Materials xx 58%	Packaging xx 92%	Bottles / Canisters		22%	12%	12%	12%	10%	12%	3%	3%	3%	10%	3%	5%	5%	10%
		Corrugated		5%	10%	15%	15%	5%	10%	0%	3%	12%	10%	5%	5%	5%	5%
		Pouches		1%	13%	13%	12%	5%	5%	8%	3%	15%	10%	4%	4%	4%	4%
		Substrate		45%	3%	8%	15%	8%	15%	3%	4%	11%	15%	2%	5%	7%	4%
		Labels		**4%**	13%	13%	12%	5%	5%	8%	3%	15%	10%	4%	4%	4%	4%
		Closures		6%	12%	10%	12%	5%	15%	7%	3%	7%	10%	4%	5%	5%	5%
		No Details		18%													
	Raw xx 8%	Active Ingredients		92%	10%	13%	12%	8%	14%	8%	4%	10%	5%	5%	4%	4%	3%
		Inactive Ingredients		0%													
		Fragrance		8%	10%		12%	8%	14%	8%	4%	10%	5%	5%	4%	4%	3%
Operations xx 31%		Package Processing	-	0%													
		Product Processing	-	0%													
		Packing	-	0%													
		Co-packing		99%	15%	8%	20%	0%	10%	8%	2%	10%	7%	10%	0%	5%	6%
		All Other Overhead		1%													
Logistics xx 10%		Warehousing		38%	0%	15%	20%	0%	0%	20%	0%	0%	15%	15%	0%	0%	15%
		Shipping		62%	0%	10%	10%	15%	0%	10%	15%	10%	5%	10%	0%	0%	15%

… and the size of the potential opportunity

Potential Savings Areas

Manu-facturing	Distri-bution	Sales & Marketing	Post Sales Services	Other
▪ Direct Material ▪ Direct labor ▪ Overhead ▪ Engineering – design, test, sustain ▪ Tooling ▪ Facilities	▪ Inventory Reduction ▪ Obso-lescence ▪ Elimination of VALO Work ▪ Freight – Inbound ▪ Carrying costs ▪ Cost of ordering, stocking & scrapping	▪ Centralized Sales & Marketing ▪ Sales tools ▪ Marketing Material ▪ Training ▪ Personnel ▪ Order to delivery cycle times	▪ Admin ▪ Warranty ▪ Broken calls ▪ Sales Call Efficiency ▪ Installation expense ▪ Training ▪ Contracting ▪ Documen-tation	▪ Budgeting ▪ Information Management Systems ▪ Expediting to address order errors ▪ Billing errors ▪ Billing tables ▪ Compen-sation systems

Cost Reduction Opportunity from Design to Value



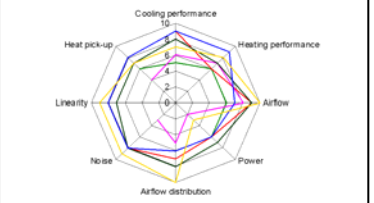
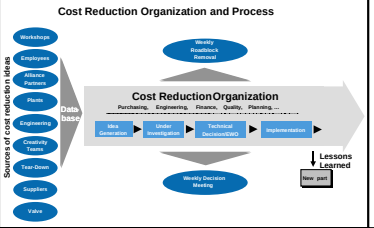
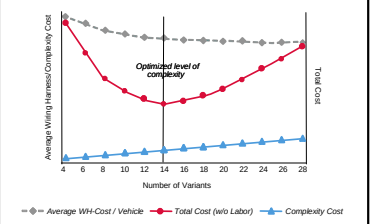
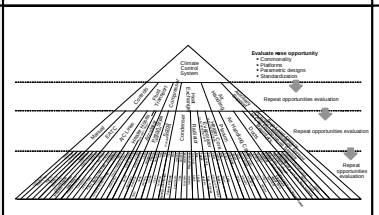
Potential: $200M

Potential from Design to Value

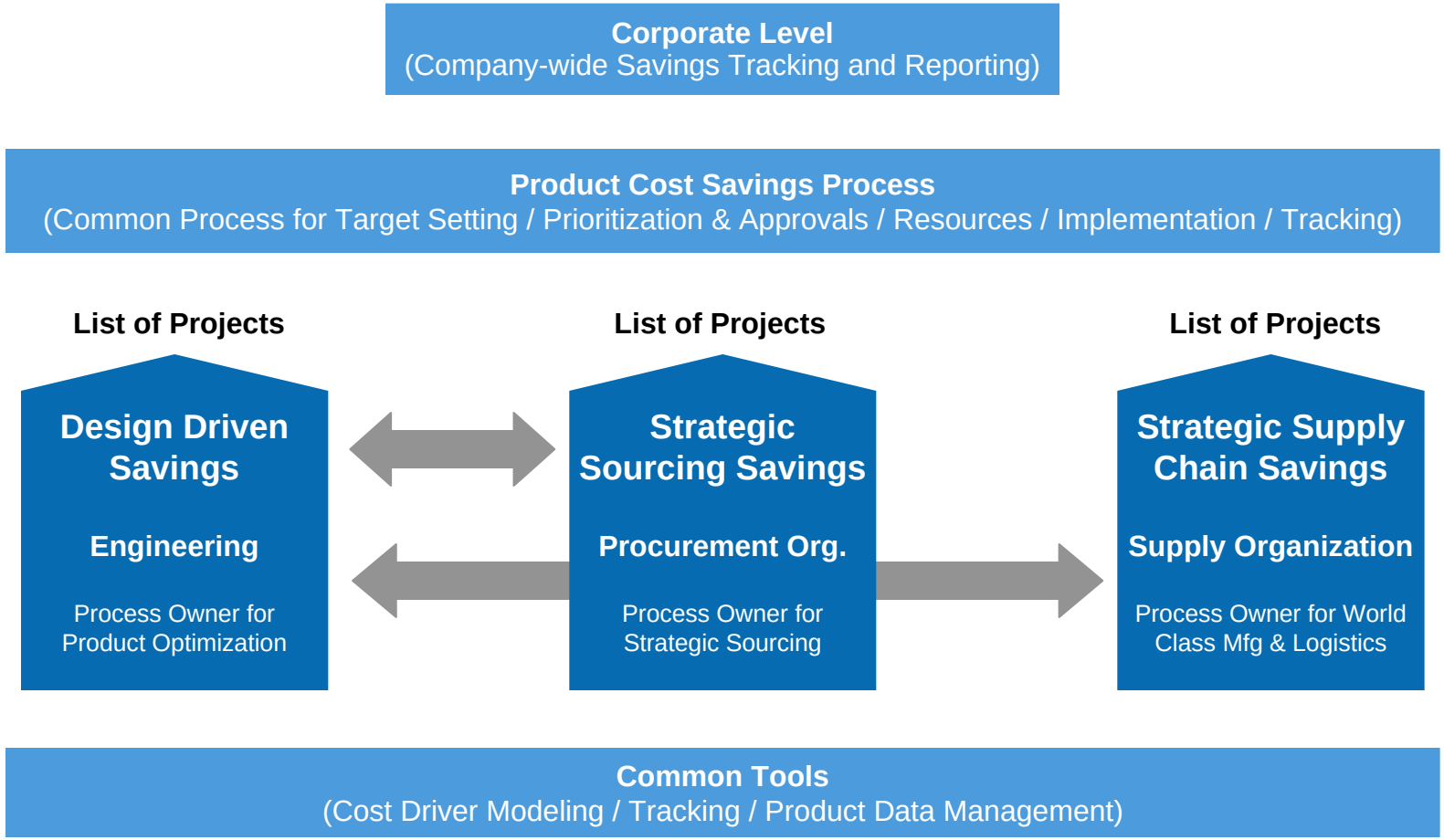
Opportunity: $100M

Potential reduced by 50% to account for e.g., late stage customization efforts

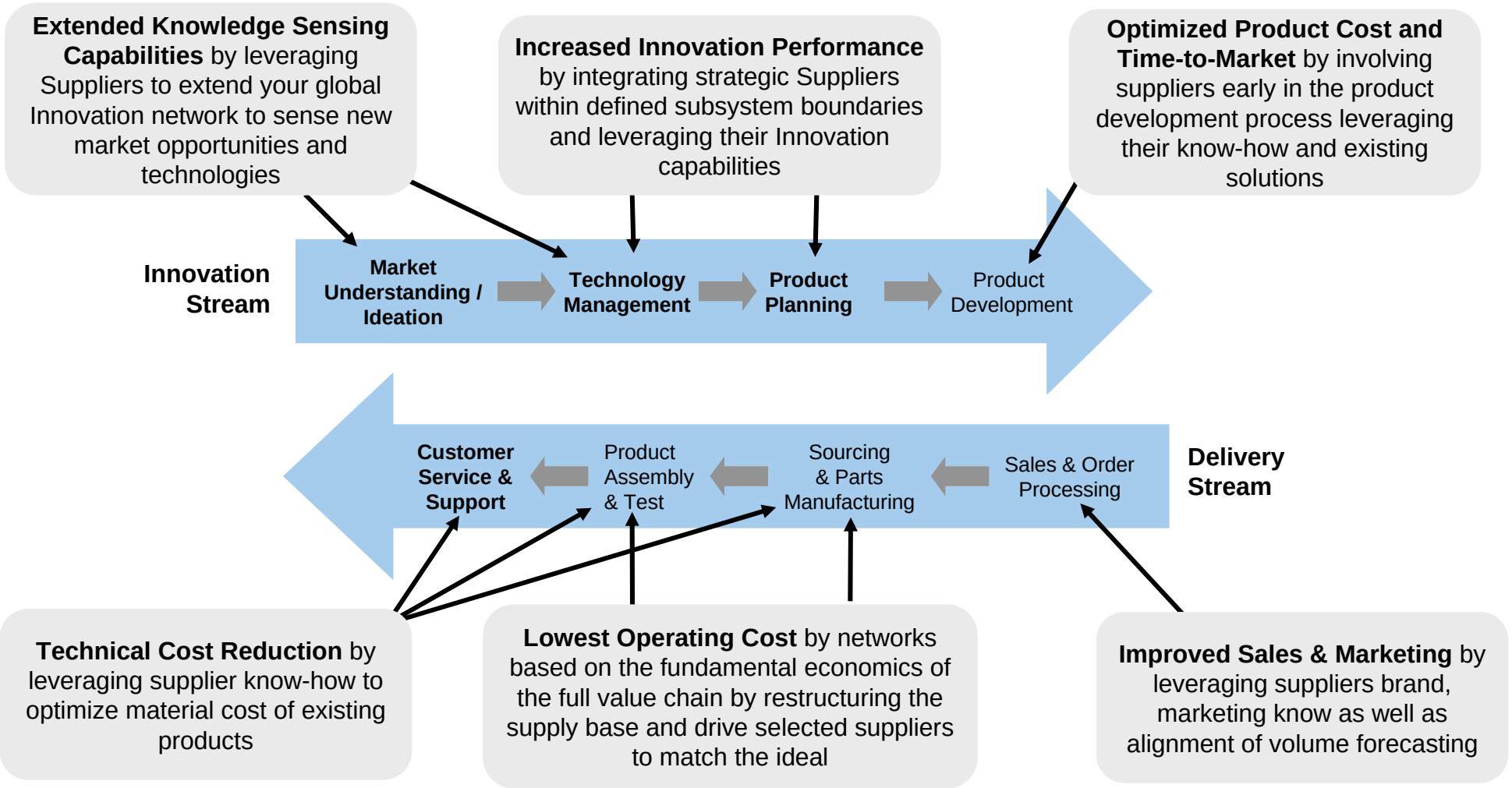
There are four key levers to achieve product cost / complexity reduction

Best Practice		Elements of Approach	Tools
Intelligent Specs		▪ Leverage the knuckle points where small change in spec yield large cost savings/penalty ▪ Use of functional specification during sourcing process	▪ Specification spider charts ▪ Concept sheet approach ▪ Early supplier involvement
Technical Cost Reduction		▪ Re-design of existing parts, e.g. – Substitution of material – Reduction of material consumption – Elimination of finishing operations – Simplification of functionality	▪ Cross-functional, structured process from idea generation to implementation ▪ Supplier involvement
Commonality / Re-use		▪ Use of common or carry-over parts for new design ▪ Reduction of complexity in existing products	▪ Complexity trade-off analyses ▪ Concept sheet approach ▪ Component library ▪ Commonality workshop
Product Architecture / Platformization		▪ Use of common core architecture ▪ Construction of derivative products while maintaining high degree of component commonality across derivatives	▪ Economic trade-off considering entire value chain ▪ Commonality indices analysis

This process inherently needs to be cross-functional with complete buy-in from engineering / R&D



Integration of suppliers is critical to optimizing choices for the extended value chain



Many great new products also fail due to commercialization mistakes – example of best practices

Perform Rigorous Sales Projections	▪ Ensure objective marketing assumptions (advertising spend, distribution build) in volumetric tests (e.g., BASES) ▪ Rigorously estimate the pipeline sizing ▪ Employ a consistent forecasting methodology
Optimize Launch Timing	▪ Take into account product seasonality ▪ Avoid launching during holiday (October – January) ▪ Work with key retail account to coordinate launch with shelf reset
Ensure Strong Advertising Support	▪ Use shortest length necessary to convey your copy message ▪ Consider testing alternate copy lengths ▪ Successful initiatives tend to borrow media from the parent
Prepare for Competitive Response	▪ Perform competitive response modeling – often leads to modifications to the initiative to increase the probability of success ▪ Competitive response modeling helps to address the following considerations: – How important to competition is the business we're threatening? – What is the absolute worst thing we could think of doing if we were in competitions' shoes? – Areas of sustainable competitive advantage (for you and for competition)
Develop a Detailed Launch Plan	▪ Develop and use a comprehensive new product launch template to ensure that all considerations are taken into account ▪ Incorporate lessons learned and best practices from past launches

Align Innovation Strategy with Corporate Strategy

Make the Right Bets

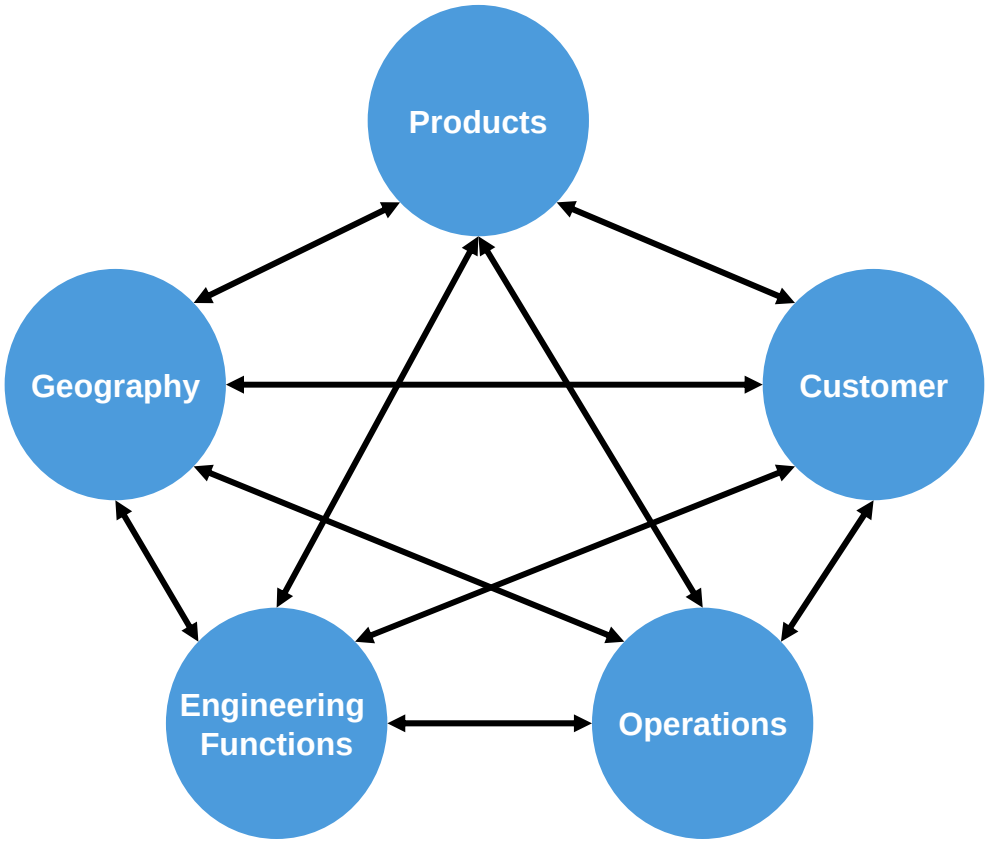
Manage the Pipeline with Speed & Efficiency

Ensure your "Innovation OrgDNA" is Healthy

Organizing for innovation requires a careful balance among multiple dimensions

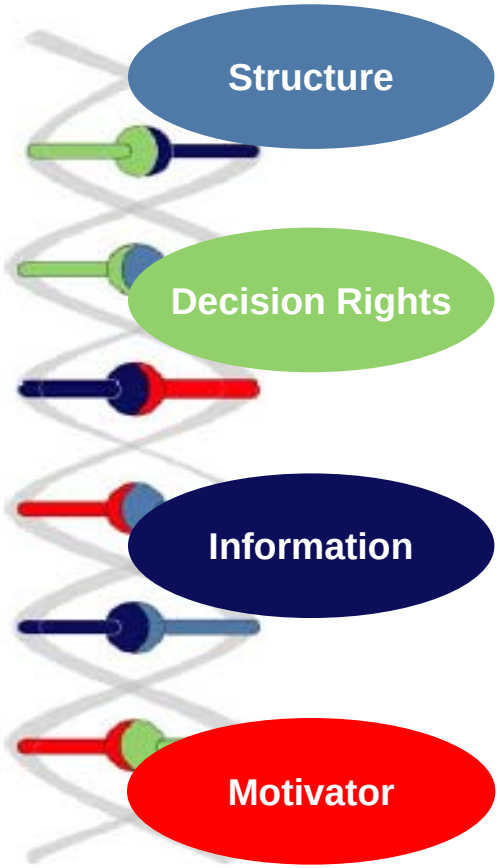
- Innovation is inherently a **highly cross-functional, cross-organization activity**
- Effective organizational performance often **determines a company's success** at developing winning products and services
- While a recent Booz & Company study found that **>50% companies restructured their innovation organizations** in the last two years…
- …**structure *in itself* is a poor predictor** of organizational effectiveness
- Rather, a wider range of organizational factors determine the overall performance effectiveness of an organization – a company's ***"Organizational DNA"***

Innovation Organization Dimensions and Natural "Tensions"



There are four key building blocks of an effective innovation organization — structure is but one lever

Four Building Blocks of the Innovation DNA



The overall organization model, including the "lines and boxes" of the organization

The underlying mechanics of how and by whom decisions are truly made, beyond the lines and boxes of the organization chart

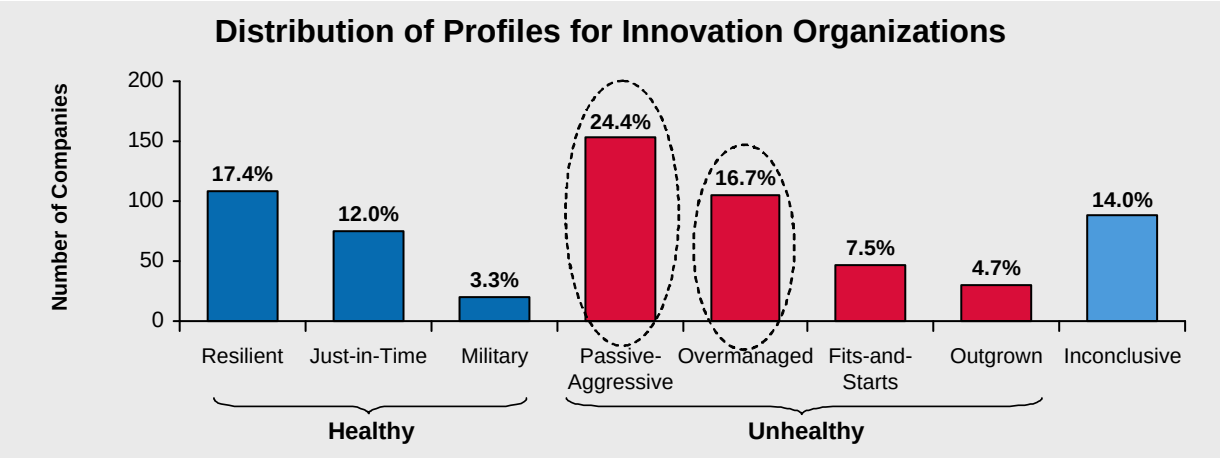
What metrics are used to measure performance? How are activities coordinated, and how is knowledge transferred?

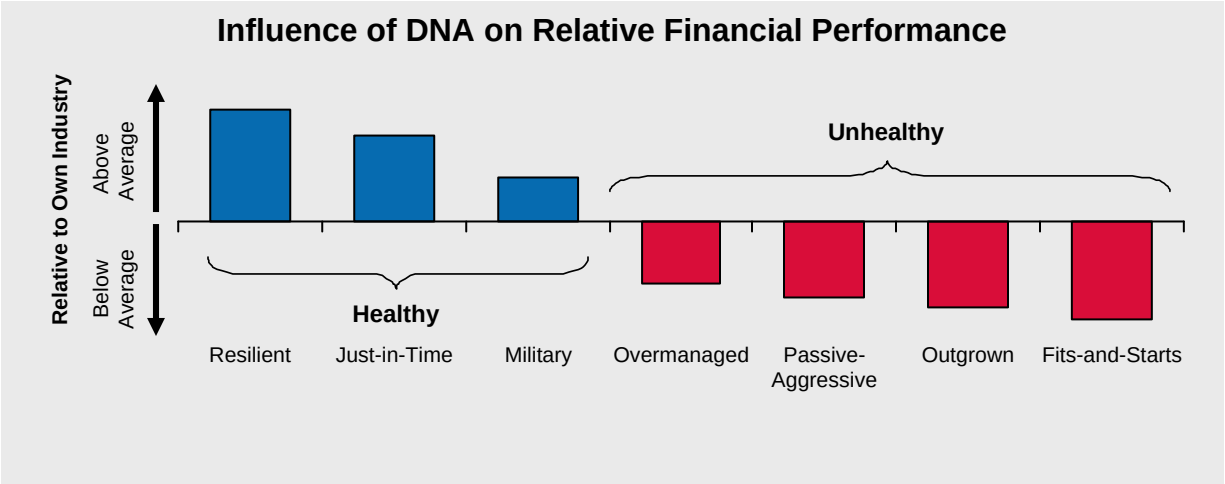
What objectives, incentives, and career alternatives do people have? How are people influenced by the company's history?

Organizational Stereotypes

- The Resilient Organization
- The Just-In-Time Organization
- The Military Organization
- The Outgrown Organization
- The Overmanaged Organization
- The Fits-and-Starts Organization
- The Passive-Aggressive Organization

Indeed, from our research >50% of R&D/Innovation organizations demonstrate unhealthy OrgDNA – impacting performance





Observations

- Innovation organizations are about 60% more likely to be unhealthy
- More than 80% of unhealthy organizations fall in two categories
  - Passive Aggressive
  - Overmanaged
- Unhealthy organizations lack the typical characteristics of healthy innovation organizations
  - Slow speed: Analysis paralysis, "too many approvals", "agree but nothing changes"
  - Lack of Transparency: Execution contrary to decisions, inaccurate business understanding, "surprising outcomes"
  - Lack of accountability: Shared accountability, unclear decision making & governance, cross-functional issues
- "Healthy" organizations significantly outperform "unhealthy" ones

Source: Booz & Company OrgDNA Profiler℠

To fully exploit its innovation potential, an organization's DNA needs to be reengineered

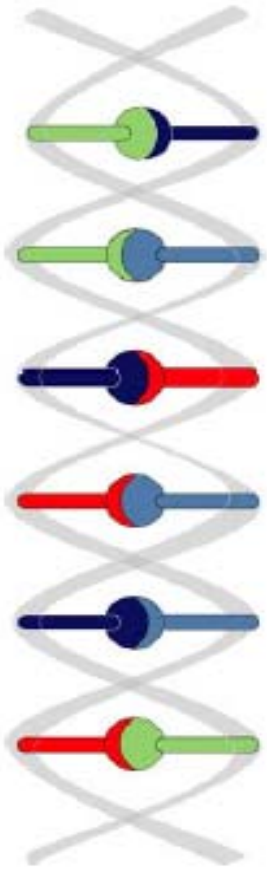
Remedies for Healthy Organization DNA

Decision Rights

- Cross-functional empowered teams for innovation processes in place
- Decision authorities and responsibilities as black and white as possible to streamline decision flows (e.g., between functions and projects)

Information

- Innovation strategy is shared and understood throughout the company
- Lean set of innovation metrics in place and closure of the loop on performance
- Knowledge and ideas are fast and widely shared by appropriate incentives



Motivator

- Senior Management committed to innovation
- Dissenters are valued, risk-taking is encouraged, ideas are rewarded
- Freedom for employees to spend part of their time to think and work on new ideas
- Resources available to fund work on new ideas

Structure

- Lean but empowered Innovation Management group in place (for coordination)
- Resources available to fund work on new ideas
- Span of control in R&D is 1 to ~12 or higher
- "Slow" fast career track – encourage rotation providing people with a broad exposure to functions and sites

A balanced portfolio of metrics is key to creating information transparency at all organizational levels – including early warning

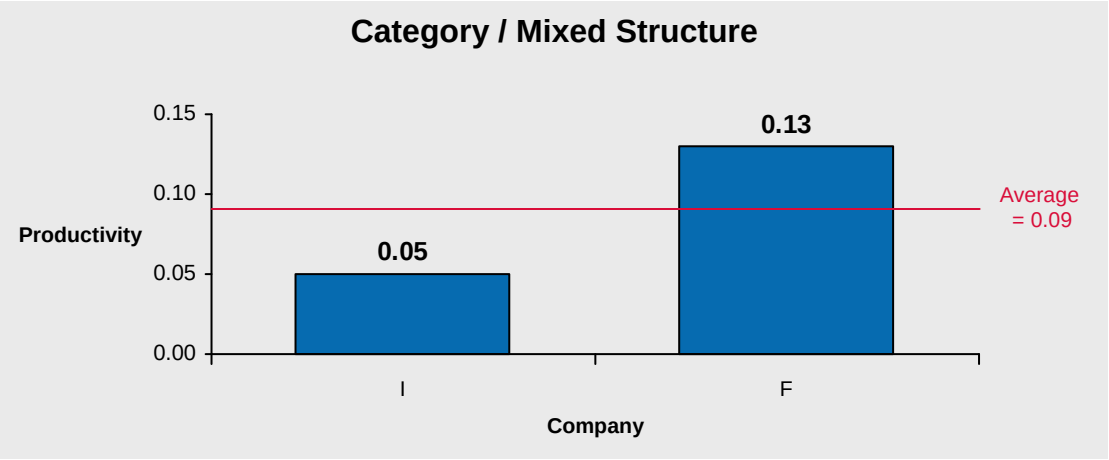
Metric Selection Criteria

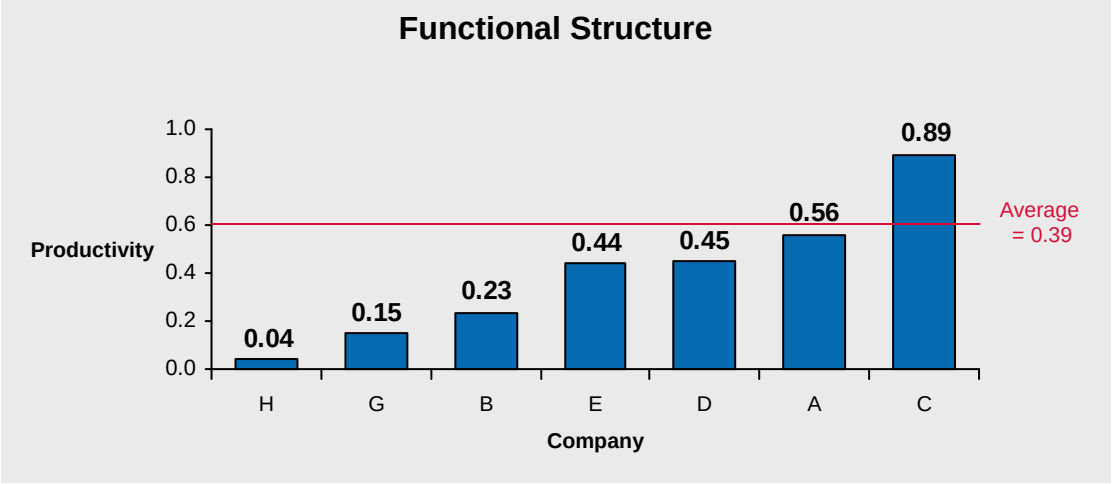
- Tied to critical success factors, e.g.,
  - Time
  - Cost
  - Quality
  - Features
- Creates balanced portfolio
  - Predictive
  - Product performance
  - Output
- Needed to facilitate cross-project decisions
- Relevant to teams at working level
  - Information across inter-dependent projects
  - Information to help in planning future projects
- 80/20 pragmatism

Client Example: Computer Systems

METRIC	TYPE	"HOOKED" INTO: Tech Roadmap	Arch. Committee	Tech Devel. Process	Product Process	LEVEL: Corporate	Group	Division	Project	Function	RATIONALE FOR SELECTION
1) Project Risk	Predictive			●	●		■	■	■		• Critical for both project and portfolio management
TIME METRICS											
2) Milestone Progress	Process/Predictive			●	●	■	■	■	■	■	• Basis for setting "standards" for critical path activities & flagging problems
3) Actual Staffing vs. Plan	Predictive			●	●		■	■	■		• Predictor of schedule slippage
QUALITY METRICS											
4) Warranty and Repair Cost %	Output				●	■	■	■	■		• Data available
5) Product Request Volume	Output				●			■	■		• Reflects design quality and customer satisfaction
6) Test & Validation yield	Predictive			●	●		■	■	■	■	• Indicator of HW stability prior to volume production
7) SW Defects	Predictive			●	●		■	■	■	■	• Indicator of SW stability
FEATURES METRICS											
8) Tech Lead/Lag vs. Competition	Output	●	●*	●		■	■				• Measures roadmap process; technology competitiveness trends
9) Requirements Coverage	Process		●*	●	●		■	■	■		• Tracks whether product built to plan
COST METRICS											
10) Product Cost Performance	Process			●	●	■	■	■	■		• Significant financial impact
11) Project Cost Performance	Process			●	●		■	■	■		• Current metric
12) Part Commonality	Output		●*		●	■	■	■	■		• Driver of cost, quality, operational complexity and time-to-market
13) Standard Part Usage	Process		●*	●	●	■	■	■	■		• Driver of cost, quality and time-to-market

Our experience suggests that a global functional R&D organization tends to drive higher R&D productivity





Benefits of Functional Alignment

- **Better utilization of resources**
  - Cross-category sharing of available FTEs
  - Clearer priorities
- **More efficient project planning**
  - Greater transparency into workload and capacity of functions
  - Ability to time-shift projects and change allocations
- **Shorter time to launch, due to more efficient use of resources and more realistic scheduling**
- **Greater knowledge sharing & specialization, improving skill levels**