

☛ **Company Information**—Snark provides enterprise and consumer customers with a full range of high-tech equipment, including personal computers, servers, storage devices, printers, and networking equipment. Its software portfolio includes operating systems, print management tools, and OpenView, a suite that encompasses application, business, network infrastructure, and product life-cycle management. Snark also boasts an IT service organization that is among the world’s largest.

2005 Revenue:	US\$86.7 Billion (€70.0 Billion)
2005 Employees:	150,000

☛ **The Costs of Portfolio Proliferation**—In today’s business environment, organizations face constant pressure from the market and the end consumer to add new features/platforms to products and services. Snark is no exception. Snark’s product line of consumer desktop PCs grew from 88 in 1998 to 170 in 2004. The proliferating number of products also triggered corresponding increases in unique and custom parts. While a broader product line allowed Snark to offer a wider selection—ranging from no-frills, low-cost PCs to “gaming” PCs offering enhanced video and audio—the complexity costs of adding this variety were distributed across the value chain and, in Snark’s case, resulted in tens of millions of dollars in added cost per year.

\* Pseudonym.

This study may not be reproduced or redistributed without the expressed permission of the Corporate Executive Board Company. The CFO Executive Board has worked to ensure the accuracy of the information it provides to its members. This report relies upon data obtained from many sources, however, and the CFO Executive Board cannot guarantee the accuracy of the information or its analysis in all cases. Furthermore, the CFO Executive Board is not engaged in rendering legal, accounting, or other professional services. Its reports should not be construed as professional advice on any particular set of facts or circumstances. Members requiring such services are advised to consult an appropriate professional. Neither the Corporate Executive Board nor its programs are responsible for any claims or losses that may arise from a) any errors or omissions in their reports, whether caused by the CFO Executive Board or its sources, or b) reliance upon any recommendation made by the CFO Executive Board.

# AN UNCHECKED GROWTH MACHINE

**A steady increase in competition encourages new product proliferation...**

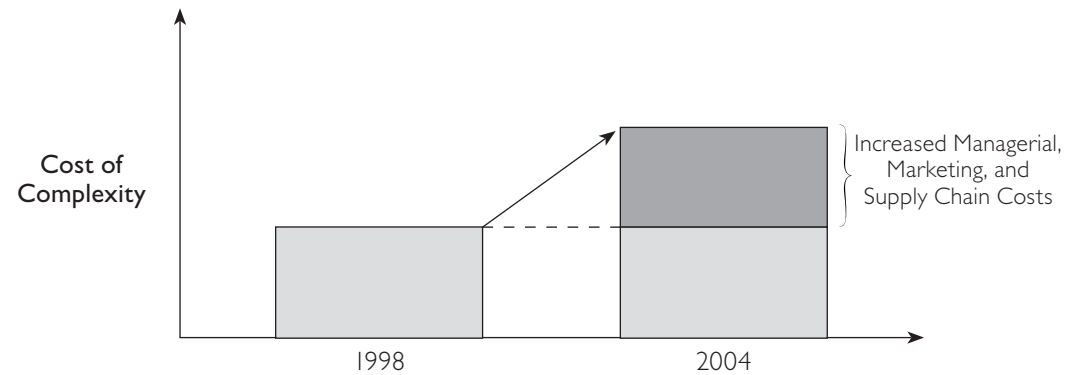
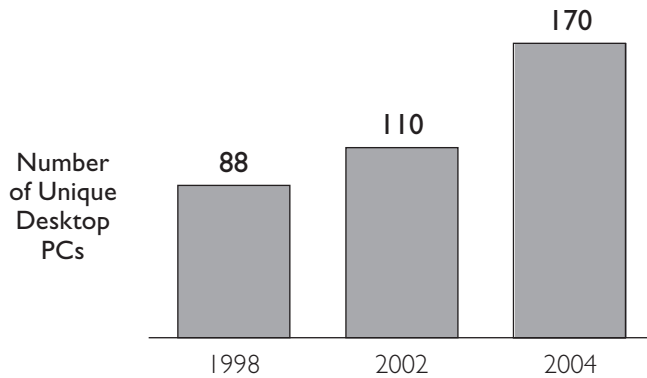
**...suggesting that the hidden costs of managing this portfolio have risen**

Product Proliferation

Snark, 1998–2004

Increasing Costs of Complexity

Illustrative



## MANAGING COMPLEXITY COSTS

“Last year, Snark generated \$80 billion in revenue and \$3.5 billion in profit and offered more than 90 different product lines for sale in 160 countries. To a company of this size, the impact of successfully managing product line complexity, or the cost of its mismanagement, can easily reach into the hundreds of millions of dollars.”

“Managing Product Line Complexity”  
Institute for Operations Research and  
Management Science, *ORMS Today*  
June 2005

\* Pseudonym.

Source: Cargille, Brian, and Chris Fry, “Managing Product Line Complexity,” *ORMS Today*, (June 2005); Snark Company; Business Leadership Forum research; CFO Executive Board research.

- ∞ **Product Portfolio Complexity Management**—Snark measures the costs and benefits of complexity and then uses these measurements to guide product-line planning. Major components of Snark’s approach include the following:
  - *Component #1 Identifying the Impact of Complexity on Cost*—Snark’s PC division interviews a group of cross-functional executives to uncover major cost categories impacted by adding new products to the portfolio.
  - *Component #2: Quantifying Complexity-Driven Costs*—The team deconstructs identified cost categories to arrive at per-unit cost estimates. It also designs a complexity-adjusted cost calculator to allow product marketing or finance teams to enter details about a proposed SKU and get a quick assessment of the incremental complexity costs required to support that SKU.
  - *Component #3: Mapping the Impact of Individual Products on the Portfolio*—Snark replaces the standard marginal cost curve with a complexity-adjusted cost curve. The company defines complexity-cost guidelines to specify how to adjust a product-projected margin for unaccounted complexity-driven costs.
  - *Component #4: Complexity-Adjusted Product Pruning*—Snark removes from the portfolio products that are deemed to have the lowest complexity-adjusted variable contribution.
- ∞ **Key Insight**—CFOs should carefully assess the impact of new products/projects on their companies’ existing cost structures instead of evaluating their profitability in isolation. Further, to effectively evaluate the systemic impact of investments, CFOs should leverage input from the line to understand product/project interrelations.

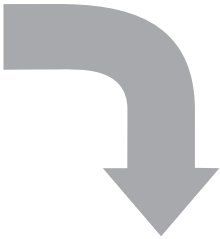
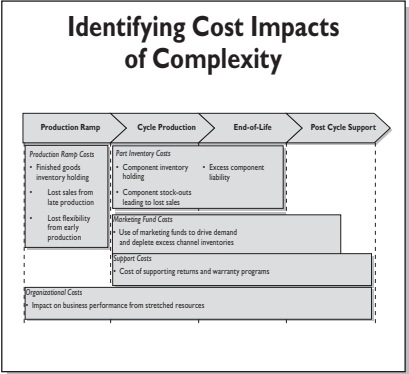
\* Pseudonym.

PRODUCT PORTFOLIO COMPLEXITY MANAGEMENT (CONTINUED)

# CUTTING THE GORDIAN KNOT

Complexity-adjusted cost analysis informs product portfolio decisions

Component #1

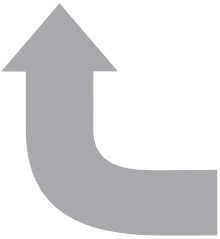
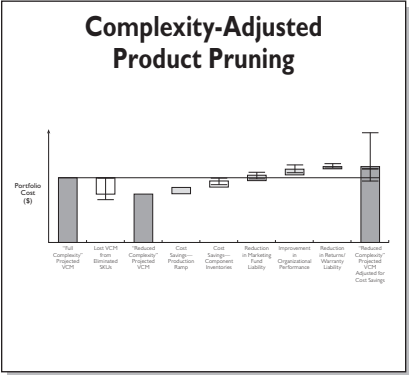


Component #2

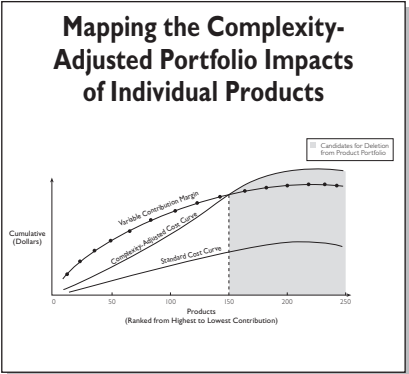
### Quantifying Complexity-Driven Costs

Complexity Cost Calculator	
Cycle	Season: Spring '05 Total SKUs planned: \$2
SKU	Name: Brand: Snark Bundle? N Forecasted volume (units): XXX Price projected? Y
Parts	Unique parts? N If so, cost/unit: N/A
Financial	ASP: \$XX Revenue/unit: \$XX VCM/unit: \$XX Expected monitor revenue: \$XX Expected monitor VCM: \$XX
Retailer	Retailer: ABC No-returns policy? N Low return rate category? N Total retailer revenue: \$XX

Component #4



Component #3



\* Pseudonym.

Source: Snark Company; Business Leadership Forum research; CFO Executive Board research.

- ☞ **Identifying the Impact of Complexity on Cost**—Snark’s PC division develops a comprehensive interview guide to uncover major cost areas impacted by adding products to the portfolio and to learn how complexity creeps into individual business functions. Members from Finance, Sales and Marketing, Operations and Supply Chain, and support functions are interviewed and asked specific questions about how additional products result in hidden costs within their individual functions. For example, when key supply chain executives are interviewed, Snark’s PC division realizes that adding one product to the portfolio causes an unaccounted increase in SKU setup costs, manufacturing ramp costs, component costs, and inventory holding costs.
- ☞ **Where the Costs Show Up**—Unsurprisingly, the costs of adding a product to the portfolio are dispersed throughout the organization. Major costs categories uncovered include the following:
  - Production Ramp Costs
  - Part Inventory Costs
  - Marketing Fund Costs
  - Support Costs
- ☞ **Quality Also Suffers**—Snark also found that the margin of error at any stage in the manufacturing or distribution processes increases disproportionately when new products are added to the portfolio. This happens because increasing the rate of testing at the same rate of new product introductions is not cost-effective.
- ☞ **Key Insight**—CFOs should leverage the direct knowledge and operational proximity of functional experts to identify complexity-related cost areas.

\* Pseudonym.

IDENTIFYING THE IMPACT OF COMPLEXITY ON COST

WHERE ARE THE HIDDEN COSTS?

Cross-functional interviews inform complexity impact analysis...

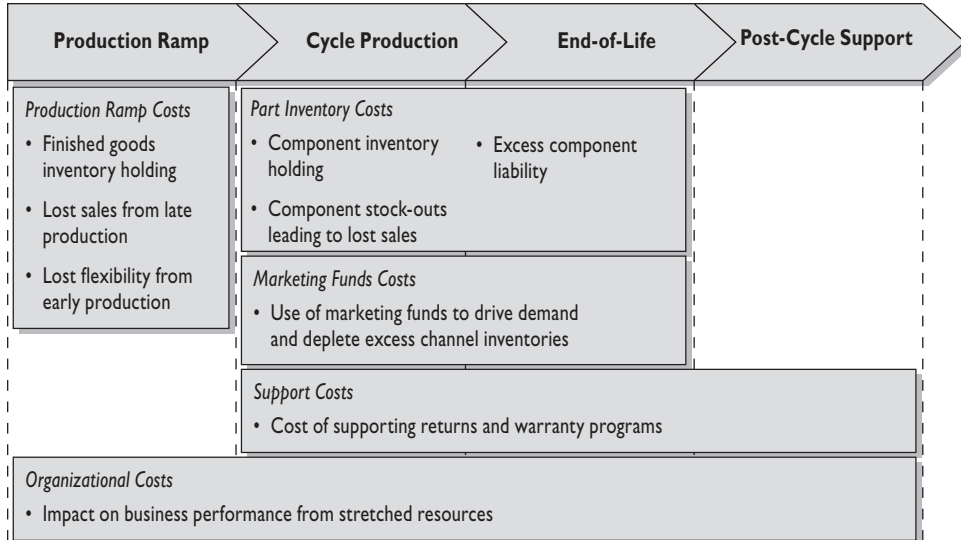
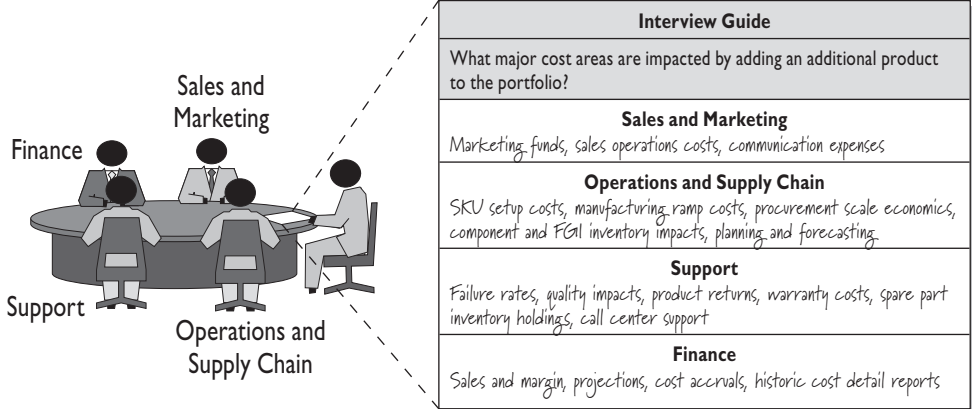
...and highlight the five biggest cost categories

Cross-Functional Complexity Inputs

Complexity Cost Categories

Illustrative

Illustrative



FAR-REACHING IMPACT

“The breadth of costs thus uncovered had far-reaching impacts on the organization as a whole. Increasing the number of desktop PC offerings greatly influences Snark’s PC-assembly processes and increases the likelihood of error.”

“Managing Product Line Complexity”  
 Institute for Operations Research and Management Science  
*ORMS Today*  
 June 2005

\* Pseudonym.

Source: Snark Company; Business Leadership Forum research; CFO Executive Board research.

This study may not be reproduced or redistributed without the expressed permission of the Corporate Executive Board Company.  
 The CFO Executive Board has worked to ensure the accuracy of the information it provides to its members. This report relies upon data obtained from many sources, however, and the CFO Executive Board cannot guarantee the accuracy of the information or its analysis in all cases. Furthermore, the CFO Executive Board is not engaged in rendering legal, accounting, or other professional services. Its reports should not be construed as professional advice on any particular set of facts or circumstances. Members requiring such services are advised to consult an appropriate professional. Neither the Corporate Executive Board nor its programs are responsible for any claims or losses that may arise from a) any errors or omissions in their reports, whether caused by the CFO Executive Board or its sources, or b) reliance upon any recommendation made by the CFO Executive Board.

- ☞ **Quantifying Complexity-Driven Costs**—Snark estimates the effects of complexity in each cost area on a per-unit basis by gathering detailed information on components, SKUs, and retailers, combined with an understanding of business operational policies (i.e., planning, forecasting, batch size, shipment frequency, etc.). This aids in quantifying the cost impacts of changes in product line size and configuration. Generally, this requires a combination of theoretical principles (such as statistical techniques for calculating inventory-pooling benefits) and empirical measurement.
- ☞ **A Holistic Approach**—To facilitate rapid evaluation of proposed SKUs, Snark develops a complexity calculator that allows product marketing or finance teams to enter details about a proposed SKU and get a quick assessment of the incremental complexity costs required to support that SKU. For example, a proposed SKU for the spring 2005 lineup is evaluated. The “Planned VCM” (variable contribution margin), including attached monitor sales if any, is determined based on the volume projection and margin rate input by the user. Then the costs of complexity, along with other unaccounted expenses specific to the business, are subtracted from the expected VCM to come up with an “Adjusted VCM” (net of complexity costs). Using this calculator, Snark was able to adjust profitability estimates for individual products to take complexity costs into consideration.
- ☞ **Key Insight**—CFOs should leverage existing cost information to create simple tools that can help the line understand and evaluate the total cost of launching products or projects. The cost of creating such tools is much lower than the benefit of enabling the line to make cost-effective decisions.

\* Pseudonym.

QUANTIFYING COMPLEXITY-DRIVEN COSTS

METRICS THAT MATTER

Detailed cost information on individual components, SKUs, and retailers...

...serves as input for complexity-adjusted cost analysis

Complexity Cost Components  
Illustrative

Cost of Complexity Calculation  
Snark, Illustrative

Analysis Inputs	
For each component	<ul style="list-style-type: none"> <li>Order lead time</li> <li>Cost</li> <li>SKU allocation</li> <li>Inventory holding policy (weeks of stock)</li> <li>Salvage value</li> </ul>
For each SKU	<ul style="list-style-type: none"> <li>Manufacturing factory allocation</li> <li>Expected net revenue (dollars/unit)</li> <li>Expected variable contribution margin (VCM dollars/unit)</li> <li>Forecasted lifetime volume</li> <li>Eligibility for price protection</li> </ul>
For each retailer	<ul style="list-style-type: none"> <li>SKU allocation</li> <li>Return rates (historical)</li> <li>Marketing fund liability (historical)</li> </ul>
Other inputs	<ul style="list-style-type: none"> <li>Lifetime volume forecast variability (historical)</li> <li>Retailer order lead time</li> <li>Supplier holding cost (percentage per year)</li> <li>Factory capacities</li> <li>Depreciation rates</li> </ul>

Cycle	Season: <b>Spring '05</b>
	Total SKUs planned: <b>52</b>
SKU	Name: <b>XXXX</b>
	Brand: <b>Snark</b>
	Bundle? <b>N</b>
	Forecasted volume (units): <b>XXX</b>
Parts	Price projected? <b>Y</b>
	Unique part(s)? <b>N</b>
Financial	If so, cost/unit: <b>N/A</b>
	ASP: <b>\$\$\$</b>
Retailer	Revenue/unit: <b>\$\$\$</b>
	VCM/unit: <b>\$\$\$</b>
	Expected monitor revenue: <b>\$\$\$</b>
	Expected monitor VCM: <b>\$\$\$</b>
Retailer	Retailer: <b>ABC</b>
	No-returns policy? <b>N</b>
	Low return rate category? <b>N</b>
	Total retailer revenue: <b>\$\$\$</b>

Planned VCM	\$XX
<b>Unaccounted Expenses</b>	
Base marketing fund liability	(\$XX)
Returns and warranty	(\$XX)
<b>Complexity Effects</b>	
Organization and manufacturing	(\$XX)
Inventory and shortage	(\$XX)
Additional marketing fund liability	(\$XX)
Additional return liability	(\$XX)
Adjusted VCM (net of complexity costs)	\$XX
VCM as percentage of revenue	XX%

Snark collected detailed information in each area to build a spreadsheet-based model showing the impacts of product line changes on each of the identified cost categories.

\* Pseudonym.

This study may not be reproduced or redistributed without the expressed permission of the Corporate Executive Board Company.  
The CFO Executive Board has worked to ensure the accuracy of the information it provides to its members. This report relies upon data obtained from many sources, however, and the CFO Executive Board cannot guarantee the accuracy of the information or its analysis in all cases. Furthermore, the CFO Executive Board is not engaged in rendering legal, accounting, or other professional services. Its reports should not be construed as professional advice on any particular set of facts or circumstances. Members requiring such services are advised to consult an appropriate professional. Neither the Corporate Executive Board nor its programs are responsible for any claims or losses that may arise from a) any errors or omissions in their reports, whether caused by the CFO Executive Board or its sources, or b) reliance upon any recommendation made by the CFO Executive Board.

- ☞ **Mapping the Impact of Individual Products on the Portfolio**—Traditional product-pruning exercises involve removing products with the lowest inventory turns, lowest revenue, or lowest variable contribution margins from the portfolio. These traditional methods do not factor in complexity. Snark found that complexity costs increase exponentially as the size of the product portfolio grows. Snark identified the point at which the complexity-adjusted cost curve intersects the marginal revenue curve to determine a smaller and more optimal portfolio size than the one determined by a standard marginal cost curve. Several low-volume SKUs that seemed profitable on the margin were actually unprofitable once complexity costs were taken into consideration.
- ☞ **Key Insight**—CFOs should take into account hidden complexity-related costs to evaluate the real profitability of products more effectively.

\* Pseudonym.

This study may not be reproduced or redistributed without the expressed permission of the Corporate Executive Board Company.  
The CFO Executive Board has worked to ensure the accuracy of the information it provides to its members. This report relies upon data obtained from many sources, however, and the CFO Executive Board cannot guarantee the accuracy of the information or its analysis in all cases. Furthermore, the CFO Executive Board is not engaged in rendering legal, accounting, or other professional services. Its reports should not be construed as professional advice on any particular set of facts or circumstances. Members requiring such services are advised to consult an appropriate professional. Neither the Corporate Executive Board nor its programs are responsible for any claims or losses that may arise from a) any errors or omissions in their reports, whether caused by the CFO Executive Board or its sources, or b) reliance upon any recommendation made by the CFO Executive Board.

# A PORTFOLIO PERSPECTIVE

**While traditional product rationalization initiatives focus on pruning products with the lowest margin contribution...**

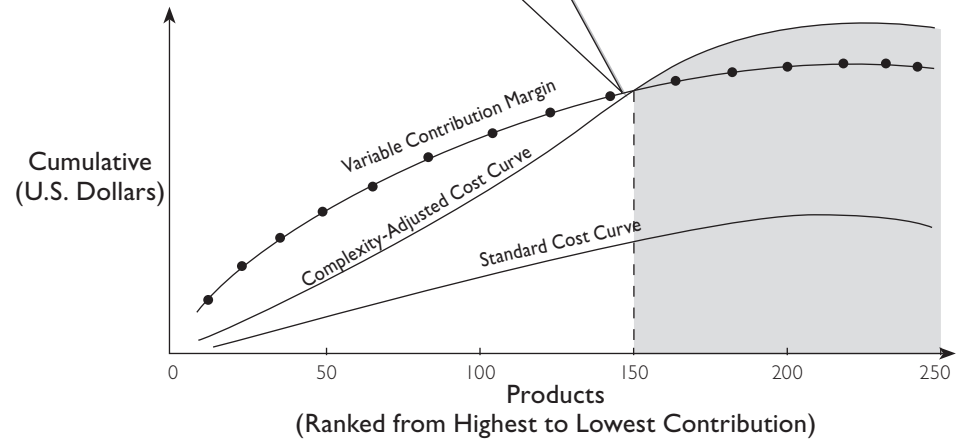
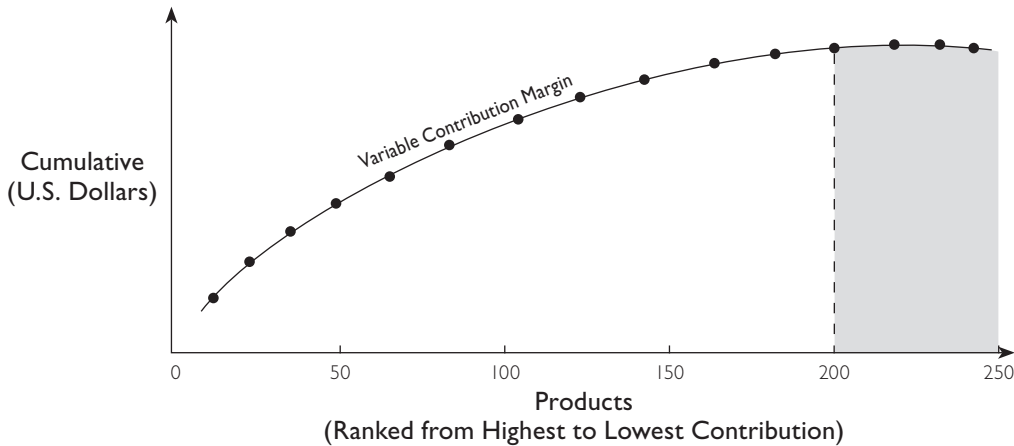
**...Snark uses a complexity-adjusted cost curve to determine the optimal portfolio size**

Conventional Product Pruning  
*Illustrative*

Portfolio Complexity-Adjusted Cost Analysis  
*Illustrative*

█ Candidates for Deletion from Product Portfolio

█ Candidates for Deletion from Product Portfolio



\* Pseudonym.

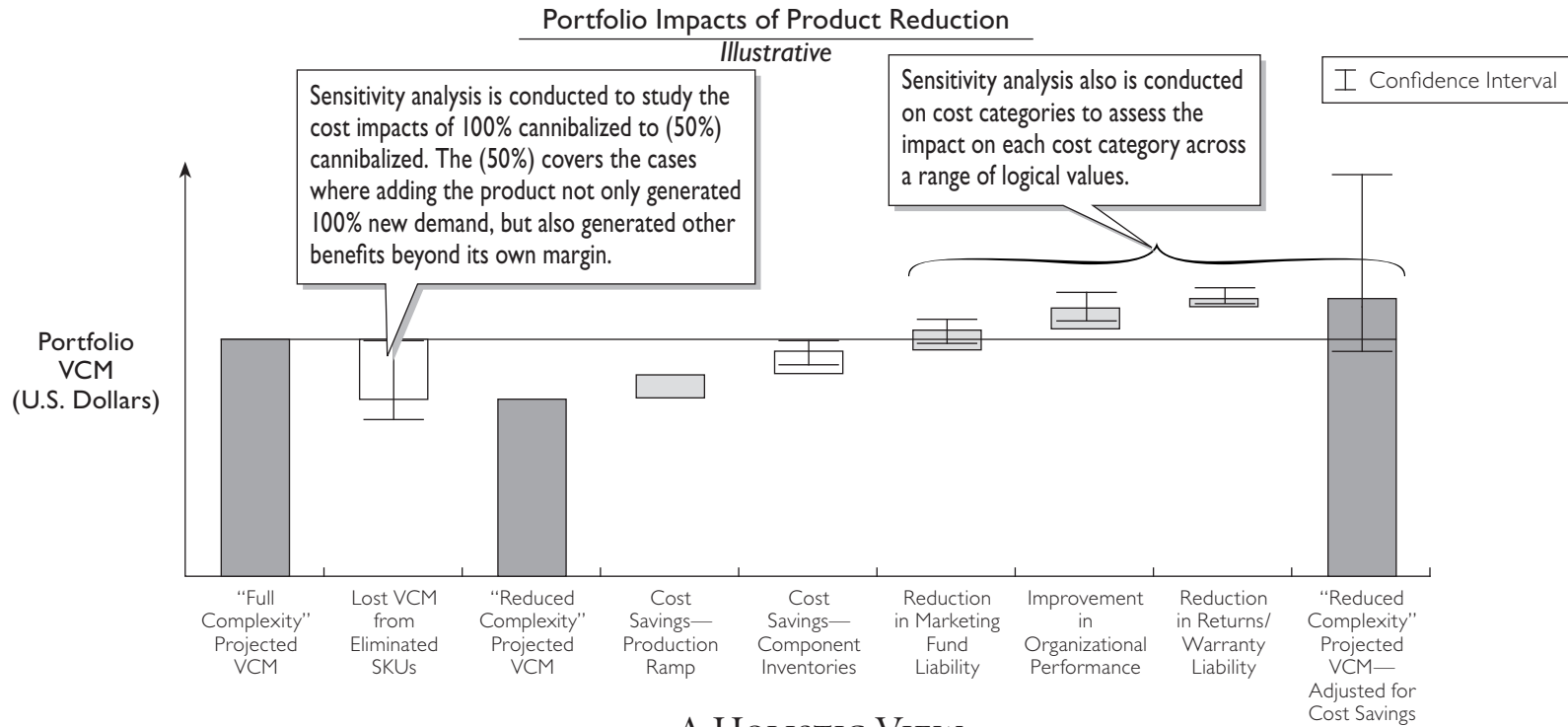
Source: Snark Company; Business Leadership Forum research; CFO Executive Board research.

- ∞ **Complexity-Adjusted Product Pruning**—To understand the rigor of the results from the complexity-adjusted cost estimates, Snark performs a sensitivity analysis on individual cost items. Snark also runs various product cannibalization scenarios to study the portfolio impact of adding/removing proposed SKUs. While adding a new product might appeal to some customers, eliminating a product may not result in the 100% loss of the forecasted revenue as customers may purchase another product in the same manufacturer's lineup if the eliminated SKU is not available. To test the impact of cannibalization on margin forecasts, Snark modeled the extreme cases of 100% cannibalized and 0% cannibalized. Snark found that even in the most generous case, there were still many instances where the cost of introducing a new product still outweighed the incremental margin. By constructing an overall confidence interval for the estimated impact of a proposed set of changes, Snark is able to objectively reject proposed unprofitable products from its product lines.
- ∞ **Key Insight**—CFOs should carefully assess the impact of new products/projects on their companies' existing cost structure instead of evaluating their profitability in isolation.

\* Pseudonym.

# ELIMINATING UNPROFITABLE SKUs

**A sensitivity analysis is conducted on costs and cannibalization impacts of proposed SKUs**



## A HOLISTIC VIEW

“If we knew with certainty that all costs were already fully reflected in our existing pricing models, the first three bars would tell the whole story. Unfortunately, this is not the case, as many costs are spread across multiple business functions and are difficult to track. When the expected cost savings in each of the five categories are considered...they outweigh the lost margin and suggest that cutting SKUs will improve overall profitability.”

“Managing Product Line Complexity”  
Institute for Operations Research and  
Management Science, *ORMS Today*  
June 2005

\* Pseudonym.

Source: Cargille, Brian, and Chris Fry, “Managing Product Line Complexity,” *ORMS Today*, (June 2005); Snark Company; Business Leadership Forum research; CFO Executive Board research.

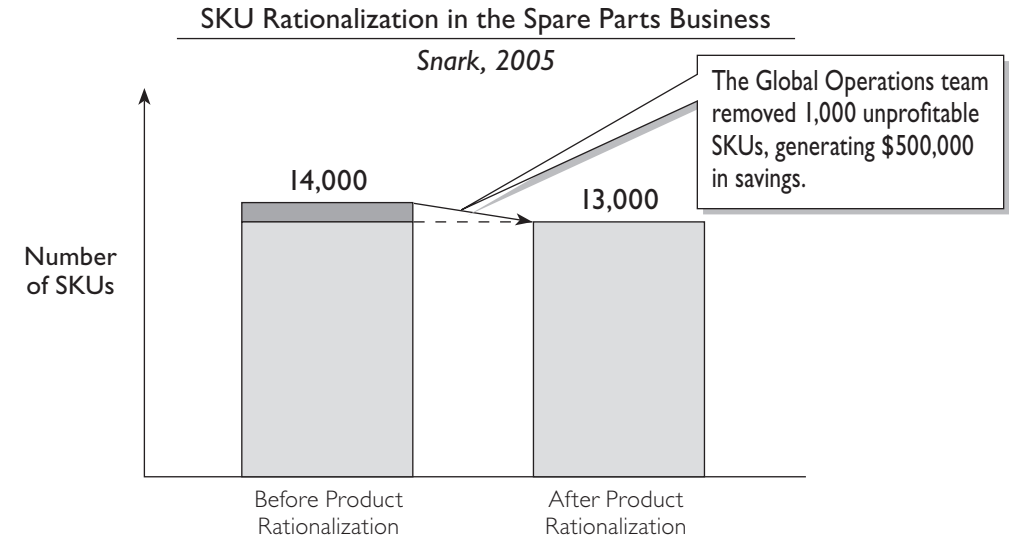
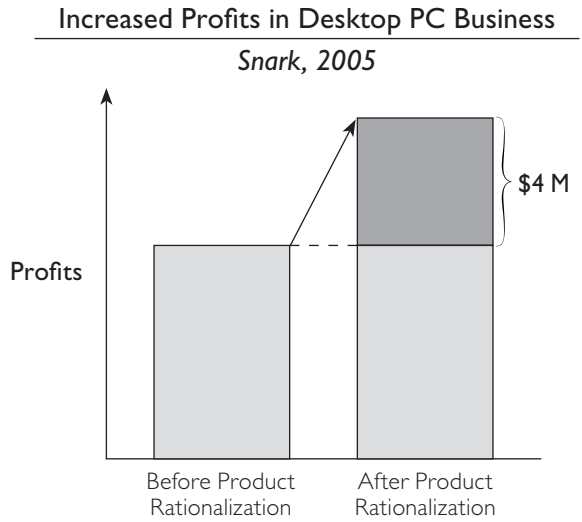
- ∞ **Results**—Snark’s desktop PC division removed numerous unprofitable SKUs from its product portfolio and accrued net savings of approximately \$4 million. Today, Snark has hardwired this practice into all new product-selection processes. Also, Snark consistently revisits its existing portfolio to understand the systemwide implications of individual SKUs.
- ∞ This practice is being successfully applied across many other Snark businesses, such as commercial and consumer desktop PCs, notebook computers, monitors, servers, and storage product lines. For example, in the past, the spare parts business had more than 14,000 different spare printer parts for sale. A variety of this magnitude created significant challenges for planning and inventory management, as support contracts from Snark’s suppliers often required end-of-life part buys prior to the expiration of Snark’s support period. By using a complexity-adjusted cost analysis, Snark worked with the spare parts business to rebalance the parts product line, generating \$500,000 in incremental annual parts sales.

\* Pseudonym.

# ELECTRIFYING RESULTS

**The initiative had significant bottom-line impact on the PC business...**

**...and informed smarter product pruning in other Snark divisions**



## HUGE GAINS

“Snark’s desktop PC division was able to eliminate several unattractive SKUs from its product portfolio and change its processes for evaluating proposed products in the future. Armed with this information, the team had clearer guidelines on when to create new SKUs. We estimated that the financial impact from this approach to North American desktop PCs was on the order of \$4 million per year.”

Brian Cargille  
Product Design Head  
Snark Company

## WIDE IMPACT

“Managing complexity is of critical and growing importance to today’s businesses. We have investigated one aspect of complexity—product line complexity—and have developed a five-step process for managing product line trade-offs quantitatively. At Snark alone, we project that these approaches can yield hundreds of millions of dollars in impact through cost avoidance, performance improvement, and margin generated from servicing unmet customer needs.”

“Managing Product Line Complexity”  
Institute for Operations Research  
and Management Science, *ORMS Today*  
June 2005

\* Pseudonym.

Source: Cargille, Brian, and Chris Fry, “Managing Product Line Complexity,” *ORMS Today*, (June 2005); Snark Company; Business Leadership Forum research; CFO Executive Board research.

INTERESTED IN MORE ON THIS TOPIC?

Contact Our Member Support Center at:

**E:** EXBD\_Support@executiveboard.com

**P:** +1-866-913-2632

This study may not be reproduced or redistributed without the expressed permission of the Corporate Executive Board Company.  
The CFO Executive Board has worked to ensure the accuracy of the information it provides to its members. This report relies upon data obtained from many sources, however, and the CFO Executive Board cannot guarantee the accuracy of the information or its analysis in all cases. Furthermore, the CFO Executive Board is not engaged in rendering legal, accounting, or other professional services. Its reports should not be construed as professional advice on any particular set of facts or circumstances. Members requiring such services are advised to consult an appropriate professional. Neither the Corporate Executive Board nor its programs are responsible for any claims or losses that may arise from a) any errors or omissions in their reports, whether caused by the CFO Executive Board or its sources, or b) reliance upon any recommendation made by the CFO Executive Board.