Operations Practice

Squeezing more ideas from product teardowns

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Technophiles of all stripes love product teardowns—the time-honored practice of dismantling products to their constituent parts to spark fresh thinking. Yet few manufacturers get the full value teardowns afford. Many senior executives marginalize the practice, viewing teardowns as Skunk Works exercises for engineers or cost-cutting tactics on the part of the purchasing department. Such views retard creativity and ensure that the ideas generated in teardowns go unexplored, moldering in functional silos.

But some companies go further. This interactive explores margin-improvement opportunities from teardowns that we've identified in our research and examines how companies are rethinking their approaches to teardowns to save more money, break down the silo mentality, and even improve the revenue potential of their products.

Industrial: Redesign for lower costs

A manufacturer of materials-handling equipment was developing a new forklift truck with the goal of minimizing both its own manufacturing costs and the customers' cost of operating the product. Recognizing that the vehicle's weight was the key design factor (a lighter vehicle would require less fuel to run and would have lower materials costs) the company's R&D engineers conducted systematic teardowns of competitor's products to study new design possibilities.

Meanwhile, executives brought in marketers, who learned that customers would indeed value the lower cost of ownership—and reduced CO_2 emissions—brought about by the new design, but they would be unwilling to pay a premium for them. This knowledge spurred the company's engineers and purchasers to work together to reduce the weight of the new forklift truck by 7% (200 kg), while ultimately lowering manufacturing costs by 12% through a combination of design changes, sourcing from low-cost countries, "clean-sheet" costing, and other traditional approaches.

The resulting vehicle consumed 4% less fuel than its predecessor and emitted eight tons less CO_2 over its lifespan—making it more appealing to customers.

Front-tire diameter reduced, and front axle moved closer to payload allowing for lighter counterweight in rear of vehicle

Engine, gearbox moved closer to rear of vehicle, shifting center of gravity rearward to support new counterweight

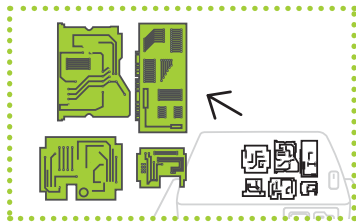**Counterweight reduced,** repositioned to support vehicle's new center of gravity

2

High tech: Break down silos

A medical-products company planned a series of teardowns to improve the design of its therapeutic medical device. To generate new ideas, executives invited colleagues from purchasing, marketing, engineering, and sales to see how their product stacked up against four rival ones.
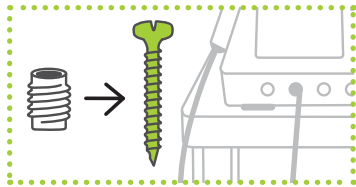
Seeing the products together was an "Aha!" moment for the purchasers, who quickly identified a series of straightforward design changes that, while invisible to customers, would significantly lower the cost of manufacturing the device. Meanwhile, seeing the configurations of competitors' circuit boards spurred the team's salespeople, marketers, and engineers to discuss the manufacturing implications of the company's modular approach to design. The engineers had long assumed that being able to mix and match various features after final assembly was advantageous and had emphasized this capability in the product's design. Yet the salespeople reported that most customers hardly ever ordered more than a handful of modules at purchase and rarely ordered more after assembly.
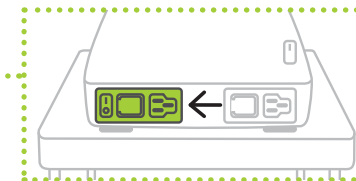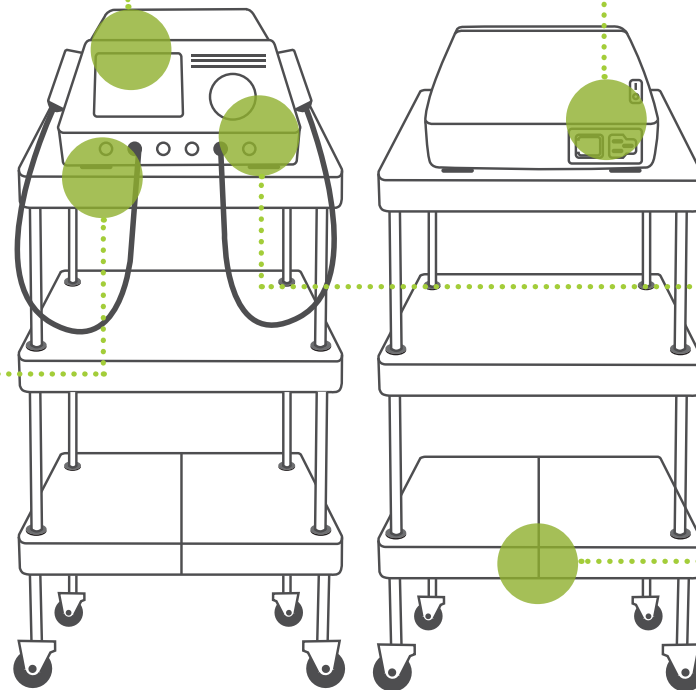
The conversations ultimately led to simplifications in the product's circuitry that lowered purchasing costs by 23% and helped marketers identify a new customer segment where the product might command a higher price.
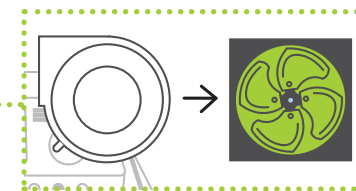
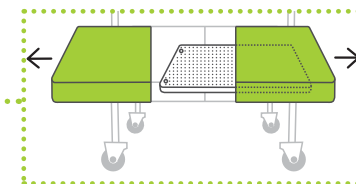**Fewer printed circuit boards (PCB):** 14% reduction in PCB cost

Self-tapping screws versus threaded inserts: 50% cheaper

Integrated plug and fuse assembly: 12% cheaper; faster to assemble

Changes in fan design from blower fan to box fan: 35% cheaper

Elimination of metal base-plate on product's cart: 4% reduction in cost of cart

Consumer goods: Reduce packaging costs

The use of product teardowns extends to a product's packaging too. However few companies examine the cost of trade-offs implicit in their packaging decisions, much less look to their competitors for ideas. Such decisions tend to be the domain of marketers, given the importance of packaging in communicating a company's brand to consumers. Yet we have seen organizations reap considerable savings. One consumer goods maker we know reduced its packaging costs for a key product by 10% by making straightforward design changes that allowed it to use less plastic in manufacturing the product's bottle.
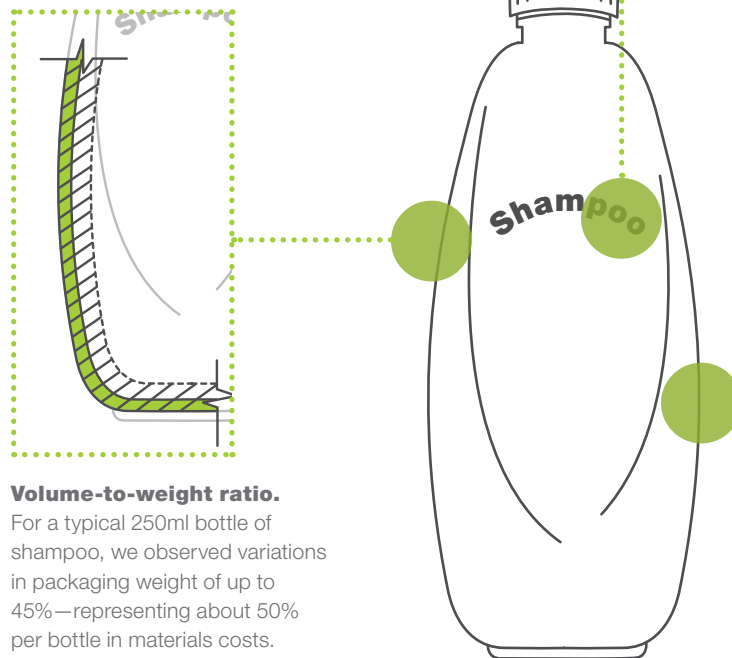
In this example, based on McKinsey research into packaging and manufacturing costs in the European fast-moving-consumer-goods industry, we highlight selected cost trade-offs associated with shampoo. ⊙
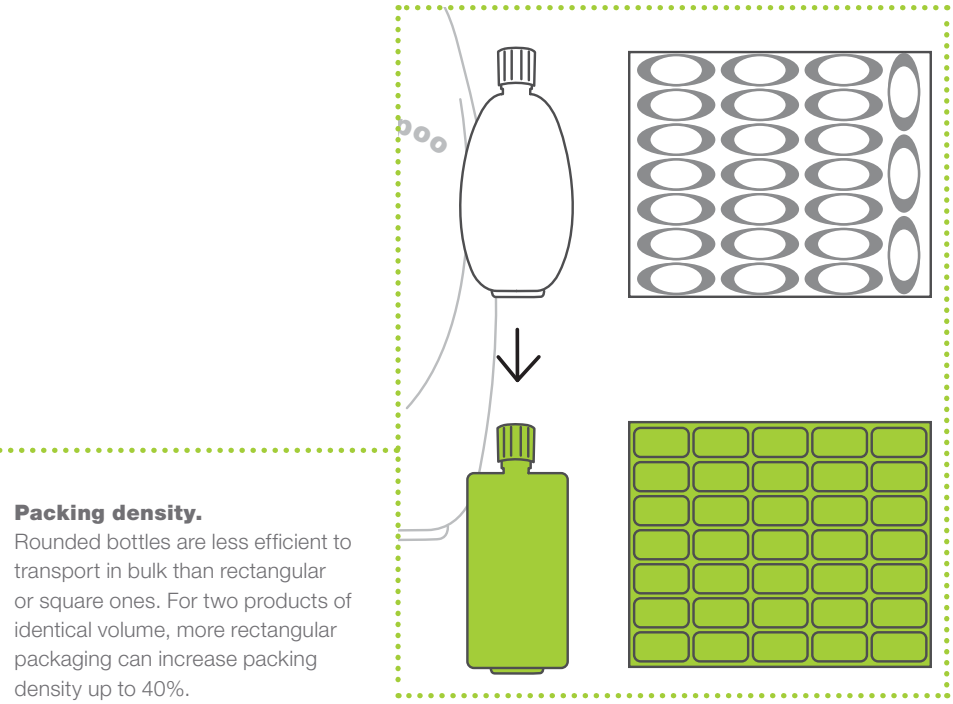
Recycled materials.
White or clear-colored plastics are more difficult to manufacture with recycled materials than darker ones. Substituting a dark-colored cap for a clear one for saves up to 20% per bottle.

Optimize labeling.
Printing labels directly onto bottle using offset, screen, or hot-stamp printing is up to 50% cheaper than printing to plastic labels that must be glued (and are harder to recycle).

Volume-to-weight ratio.
For a typical 250ml bottle of shampoo, we observed variations in packaging weight of up to 45%—representing about 50% per bottle in materials costs.

Packing density.
Rounded bottles are less efficient to transport in bulk than rectangular or square ones. For two products of identical volume, more rectangular packaging can increase packing density up to 40%.

4