McKinsey & Company

Operations Practice

Making cost engineering count

Cost engineering isn't just for car companies and chipmakers. Across sectors, complexity and cost pressures are giving companies good reason to follow a more disciplined approach to finding savings.

by Denise Cheung, Wolfgang Günthner, Patricio Ibanez, and Stephan Mohr

July 2019

Cost engineering is a long-established practice in industries that deal with big, complex projects. In the automotive and advanced-industrial sectors, for example, companies have recognized for decades the need to take a whole-lifecycle perspective, balancing the costs of procurement, manufacturing and assembly, and in-service support.

Today, companies in many sectors are making the same calculations. Pressure to do so comes from a variety of sources: margins in many sectors are being squeezed by low-cost players, while new business models that include ongoing service and support create a strong incentive for companies to minimize their products' through-life costs.

Our analysis suggests, however, that the maturity of cost-engineering capabilities still varies widely between sectors (see sidebar, "Cost-engineering maturity by sector"). And even industries that are applying the approach extensively often take a narrow approach to its use. They focus on a specific set of technical skills, such as estimation and modeling, while paying insufficient attention to cross-functional collaboration, idea generation, or the steps necessary to ensure cost-reduction opportunities are implemented and sustained. To capture the full value potential of cost engineering, a fundamental mindset shift is required.

What is cost engineering?

We believe that companies should take a comprehensive perspective to cost engineering, one that goes beyond attempts to reduce the purchase or manufacturing cost of individual components. We define this approach as follows: "A cost-focused methodology that supports the design and implementation of specifications at the lowest total cost of ownership, across the end-to-end lifecycle."

This definition encompasses several elements which are critical to our view of the scope and reach of cost engineering across the business:

— *"Cost-focused."* Cost-engineering activities are focused on bottom-line impact. If they succeed, the business will save money.

— *"Supports."* While bottom-line impact is the ultimate outcome, cost engineering must also serve as an enabler within the organization. It brings stakeholders from multiple functions together to work collaboratively on the design and implementation of specifications.

— *"Lowest total cost of ownership."* Cost engineering is holistic in scope, considering all types of cost (e.g., capex and opex, together with recurring and non-recurring costs) across the entire value chain.

Cost engineering: A cost-focused methodology that supports the design and implementation of specifications at the lowest total cost of ownership, across the end-to-end lifecycle.

— *"End-to-end lifecycle."* Cost engineering is not a standalone activity; it must be an integral part of the full produce lifecycle, from initial ideation to ultimate disposal or recycling.

Strategic mindset required

Failure to get the whole organization on board with the cost-engineering process leads to a variety of problems. Cost-reduction opportunities may be missed. Savings in one part of the value chain or product lifecycle may end up raising costs elsewhere. Seemingly valid ideas may fail in execution. And in our experience, these symptoms typically result from the interactions among five major causes.

1. *Ignoring total cost of ownership.* Excessive focus on direct material costs may mean losing track of other important costs. A cheaper input may raise logistics, tooling, processing-time or after-sales costs by enough to outweigh any hoped-for savings.

2. *Poor cross-functional collaboration.* Where cost engineering is owned by a single function, such as purchasing or engineering, hidden costs are easily missed. Purchasing might identify a supplier that can deliver at a lower price, for example, only for manufacturing to suffer higher costs and delays due to quality issues. Or engineering may design a component for which there is no local supplier available, driving up logistics costs and the risk of supply disruption.

   Involving all relevant functions in the cost-engineering process also strengthens buy-in for new ideas. That can be especially important when companies choose to outsource the creation of product cleansheets to outside organizations. If internal functions don't understand the details of the resulting cleansheets, they will struggle to use them effectively in supplier negotiations or design revisions.

3. *Analysis paralysis.* Some companies forget that the objective of cost engineering is not just to identify potential savings, but to capture them. Instead of expending endless time and effort attempting to create "perfect," highly detailed cleansheet cost models, for example, it can be more illuminating to use simpler, 80/20 approximations as a basis for constructive conversations with suppliers and between functions.

4. *Insufficient attention to building and embedding capabilities.* Some companies treat cost engineering as a one-off effort. That may address specific cost challenges in one (or a few) products. But any competitive advantage is unlikely to last if leaders don't spend the time to ensure that cost engineering skills and tools—such as benchmarking, competitor analysis, and cleansheet cost models—become part of the organization's standard operating model.

5. *Inability to scale.* Building cost-engineering capabilities in a single business unit is one type of challenge. Rolling out the approach across an entire organization is another. Introducing a new way of working to hundreds or thousands of staff across multiple locations requires a systematic change-management effort, with sustained support from top management and appropriate investment in tools, processes, and capabilities.

A working model

The experience of companies that have overcome these pitfalls is instructive. We have seen a growing number of organizations that have taken a systematic, integrated approach to their cost-engineering activities, developing skills and processes that allow them to capture savings rapidly, scale effectively, and make cost engineering an integral and sustainable part of their business. The examples below highlight successful steps taken by companies in different sectors and at different levels of cost engineering maturity.

Building new muscle in the healthcare sector

After acquisition by a private-equity firm, one healthcare company wanted to maximize its margins. The company had already identified cost-saving

opportunities with the potential to raise earnings margins by up to 30 percent. But with no in-house experience in cost engineering—combined with a history of poor collaboration between functions—the company struggled to develop and execute its cost-saving plans.

To break the deadlock, the organization chose to invest in talent. It recruited specialists from industries with a strong cost-engineering track record, tasking them to build a dedicated cost-engineering function. The primary objective was to replace the ad-hoc, fragmented approaches the company had tried before with a new set of standardized best practices.

While its work is still at a relatively early stage, the company is already achieving clear progress. It has built a complete toolkit of cost-engineering approaches, including the use of cleansheet models and standardized fact-gathering techniques. And it has applied those tools to strategically important products in its portfolio.

As well as proving the feasibility of capturing cost-reduction opportunities of 25 to 30 percent, the new cost-engineering group has broken barriers between functions, challenging stakeholders to collaborate on new solutions. And the group's success has attracted attention across the organization, strengthening belief in cost engineering's value and creating demand for further projects.

Sidebar

Cost-engineering maturity by sector

To understand the maturity of cost engineering in different companies and industry sectors, we conducted interviews and assessments at more than 75 companies worldwide. Our evaluation considered eight dimensions that contribute to an organization's ability to understand cost drivers, identify savings opportunities, and implement those savings across their product portfolios.

1. *Design tools.* How advanced and how standardized are the organization's design methods, such as idea generation, specification reviews, benchmarking, or design-to-value?

2. *Cost tools.* How advanced and standardized are the organization's cost-evaluation methods, such as should-cost models, regression analyses, or index tracking?

3. *Expertise.* Does the organization have significant in-house cost engineering expertise? Does it make use of external sources of expertise?

4. *Databases.* Does the organization have appropriate and accessible technological enablers, such as centralized databases, templates, and pricing algorithms?

5. *Process integration.* Are cost-engineering activities fully integrated into the organization's standard business processes?

6. *Organizational enablers.* Does the company have the right organizational elements to support and sustain cost engineering?

7. *Training.* Does the company have training, skills assessments, and development processes for cost engineering?

8. *Functional integration.* Is the cost-engineering function effectively integrated with other functions?

Our findings are summarized in the exhibit below. As expected, they show considerable variation in maturity between sectors. Unsurprisingly, the first sectors to adopt cost-engineering methods show the highest level of maturity today, with high-tech and advanced industries leading the pack, followed by medical products, consumer packaged goods, and some of the retail sector. Agriculture and the majority of retailers are the least mature.

Replicating muscle in consumer-goods retail

A major retail chain had developed a reputation for strong operational performance across all functions, including procurement. The company had already used cost engineering selectively in its private-label product ranges. With thousands of product lines in hundreds of categories, however, leaders knew that the company lacked the capabilities to apply best practices consistently across the whole portfolio.

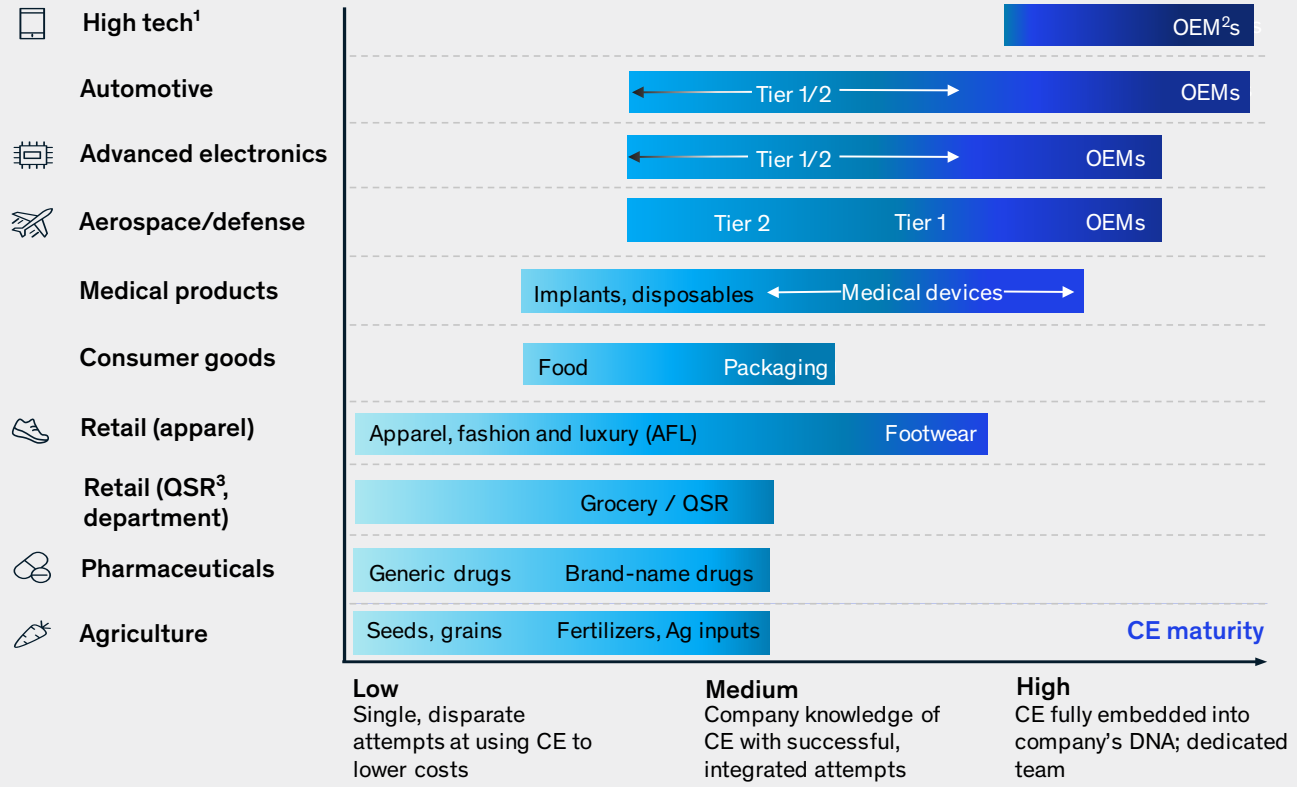
In a market defined by slow growth and margin pressure, the retailer launched a large-scale program to increase the use of cost engineering, design-to-value, and other advanced techniques in its private-label range.

The company adopted an agile model for its program, with numerous small teams co-located in its headquarters, each dedicated to a single private-label category. The teams were supported by a six-person center-of-excellence team, which helped to identify and recruit staff with strong analytical capabilities, then trained them to build cost models and conduct other cost-engineering analyses.

Since its inception, the new group has achieved significant success, with average cost reductions of 10 to 15 percent across the categories it has addressed. The group has also become a catalyst for bigger changes across the company. The retailer has reorganized its procurement and product-

Exhibit

Cost-engineering (CE) maturity is highly variable between and within sectors.



1 Includes consumer electronics
2 Original equipment manufacturers
3 Quick-service restaurants

Source: Cost Engineering Pulse Check survey, expert interviews

development functions following the agile model, and the new group has become a magnet for talent, with junior employees seeing it as a career springboard. Most spend one to two years within the group before moving on to other roles within procurement or other functions.

Fine tuning the muscle in aerospace

One aerospace company had become adept at the use of cleansheet target costing and other analytical techniques to achieve short-term component cost savings. The company knew, however, that it was leaving money on the table by not capturing longer-term opportunities through modifications to early product designs. When it looked at the root cause of the issue, the company found that poor cross-functional collaboration was hampering efforts to make the required product changes. An additional challenge was the requirement for extensive testing and validation before redesigned parts were approved for use in flight.

To overcome these barriers, the company established a new cost-engineering department, which worked with the purchasing, supply-chain, and engineering functions to analyze and deliver the end-to-end impact of design changes across its product portfolio. Using the new approach, the company was able to overcome longstanding bottlenecks to reach cost savings averaging more than 10 percent. The new cost-engineering function also collaborated closely with suppliers to introduce improved designs for manufacturing and assembly approaches. And the fact base developed during the effort is being used to inform the design of new products early on, at the concept stage.

For companies that manage to integrate cost engineering fully into their product-development, procurement, and manufacturing processes, significant bottom-line savings are only part of the story. In our experience, a strategic approach to cost engineering can also transform the effectiveness of collaboration between different functions, and between companies and their suppliers.

Denise Cheung is an associate partner in McKinsey's Seattle office, **Wolfgang Günthner** is a partner in the London office, **Patricio Ibanez** is a partner in the Cleveland office, and **Stephan Mohr** is a partner in the Munich office.

Designed by Global Editorial Services