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Excellence in cost management

A new era for aerospace

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In earlier eras, the standard response when cost pressures increased on one side of the aerospace business was to refocus on the other, so that commercial and defense revenues tended to counterbalance one another. Today, the defense sector finds itself under extraordinary pressure. But the commercial side offers little comfort, despite some manufacturers' successes in meeting the sector's increasing cost consciousness. Instead, a potential shake-up looms: with much of the airline industry continuing to destroy value, the bar on new aircraft purchases is rising as buyers demand more for less. To add to the pressure on the big Western companies, China now looms as a source for low-cost competing aircraft, and other competitors are accelerating their efforts in Canada, Japan, and elsewhere.

Moreover, our conversations with leading aerospace players have found that few major cost-reduction efforts have fully reached their goals. Partly in consequence, the future of some commercial aerospace players is at risk, and several once-promising defense programs face cancellation, affecting all levels of the supply chain.

In exploring why cost reduction in aerospace so often fails, we have unearthed two major reasons. The first is that many organizations address cost too narrowly as a supply-chain problem, an operations problem, or an engineering problem. In fact, it is all of these; companies that achieve lasting cost improvement recognize that cost is a problem that requires working across traditional functional boundaries. But the second reason aerospace cost reduction falls short is even more important: a failure to see that the real barriers are deep-seated habits, not just small-scale issues that middle managers can fix if given the right push.

Exceptional organizations take a different approach, one that involves launching three far-reaching changes at once. First, they develop cross-functional, collaborative ways of working that maximize input from specialized experts. Second, they overthrow long-standing assumptions about cost control, both internally and among their suppliers and customers. Third, they invest in new technical and commercial capabilities in areas such as teardown execution, lean manufacturing, and structured negotiation.

By backing these moves with clear targets, strong leadership commitment, and a willingness to make deep cultural changes, one major commercial aerospace player reduced its total production costs by about 4 percent in just 12 months—and 12 percent within two years (Exhibit 1).

No easy escape

For defense manufacturers, austerity in government budgets across much of the world has brought an abrupt end to years of comparatively easy prosperity. In this context, big programs are vulnerable. And finding cost-reduction opportunities will be difficult, given the larger economic and political realities of defense procurement.

Exhibit 1 One aerospace company reduced its total production costs by 12 percent within two years.

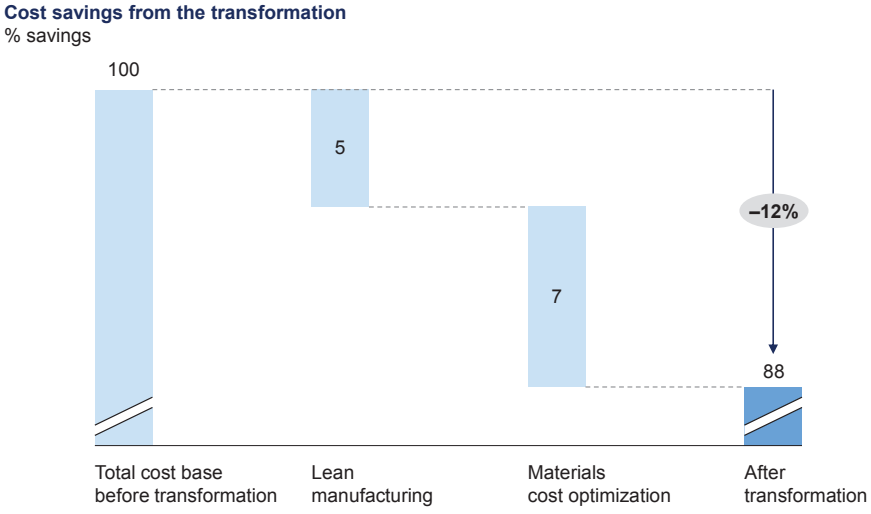
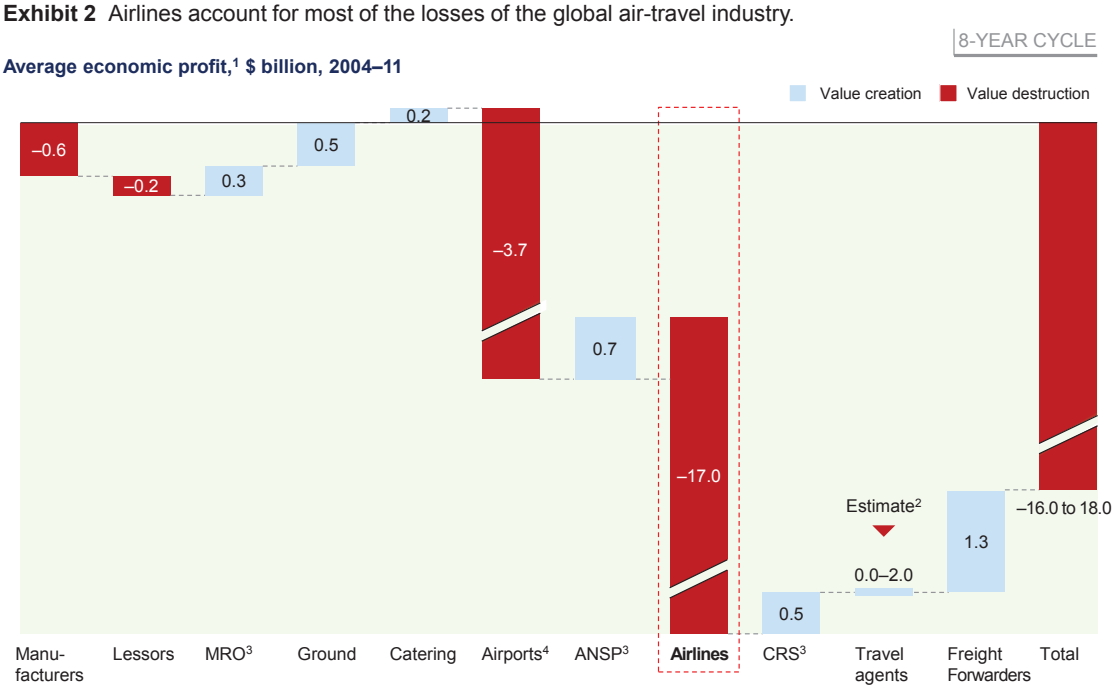


Exhibit 2 Airlines account for most of the losses of the global air-travel industry.



1 Based on invested capital excluding goodwill, extrapolated to total industry.
2 Sample too small to give meaningful estimate.
3 Maintenance, repair, and overhaul (MRO), air-navigation service provider (ANSP), central reservation system (CRS).
4 Economic profit for airport sector extrapolated based on weighted average of sample, excluding Aena Aeropuertos. Aena subsequently added back to sector estimate.
Source: McKinsey value-chain model

Some players might therefore be tempted to reduce their exposure to defense and emphasize commercial programs instead. But they would be doing so despite the fact that over the last economic cycle, the global airline industry has lost an estimated $17 billion. Losses in much of the world overwhelmed growth in emerging markets and the increasing prominence of low-cost business models (Exhibit 2).

Across much of the world, airlines remain fragile.[1] In developed markets, the most prominent exceptions are among North American carriers,[2] several of which recently emerged from bankruptcy and consolidation. It appears that a major reason several of them are now returning to some semblance of health is that their purchases of new aircraft have been restrained, particularly in comparison with leading emerging-market players. Add Delta's recent strategy of buying used rather than new aircraft, and the market for new aircraft in emerging economies provides little solace.

Squeezing the cost balloon

Nevertheless, a hard-won benefit of challenging airline economics is the resulting cost push that civilian manufacturers have made. Over the past decade several have made substantial efforts, ranging from greater outsourcing (including to low-cost countries) and tighter squeezes on suppliers to heavier reliance on lean-manufacturing techniques and stricter standards for head count and spans of control.

Many of these changes have begun to reach the defense side of the business as well. However, compared with other industries, the effects have generally been small, even for those players that adopted the new cost consciousness the most thoroughly.

Like their counterparts in other industries, aerospace companies have discovered that cost is like a balloon: squeezing at one end only causes the rest to expand. To shrink the

1 "Profitability and the air transport value chain," International Air Transport Association, Economics Briefing Number 10, June 2013 (iata.org).
2 Brian Pearce, "Global commercial airline industry outlook: June 2013 update," International Air Transport Association, June 2013 (iata.org).

balloon—and keep it that way—the industry must learn to apply pressure at many points simultaneously.

Better coordination to break down barriers

Much of the capability that an aerospace company needs to get cost under control is already present in its organization, in the form of the many experts whose ideas make the business possible. What most companies lack, however, is the right mechanism to coordinate those experts' contributions to directly attack perceived barriers to cost reduction.

Collaborate across functions

While many aerospace players occasionally assemble interdisciplinary teams, especially at the early stages of product development, few have institutionalized the practice with the necessary discipline, targets, and pacing. But in a regularly scheduled, well-structured forum, functional experts can challenge one another in ways that benefit even mature programs.

To replicate the open and generative atmosphere of early-stage product development, the team will need a clear mandate to consider all ideas, even those that might once have been dismissed as unrealistic. With that mission in place, the discussion can begin, revealing new opportunities that quickly build on one another.

The marketing team can start by reviewing certain customer requirements, enabling engineering to respond with cost-saving design changes. Manufacturing can seize the opportunity to tighten producibility standards, while procurement can apply advanced cost models to recalibrate savings targets. The quality group can then weigh in with ideas for parallel testing to reduce certification delays. In this fashion, teams at several industry leaders have quickly generated ideas that have reduced costs by 5 to 8 percent.

Overthrow assumptions

Translating the ideas into plans will take yet more discipline. Aerospace players can point to any number of reasons that cost cutting is more difficult to achieve than in other industries: dependence on single suppliers, complex regulatory requirements, aggressive customer demands, to name a few. Leaders find ways around the obstacles.

Reexamine exclusive supply contracts. Given the potential consequences of shortages in a sector where components are highly specialized, switching among suppliers is difficult, and product life cycles are long, it is no surprise that procurement departments often prioritize supply assurance above other considerations. As a result, manufacturers can find themselves locked into contracts that leave them with very little leverage in seeking cost improvement.

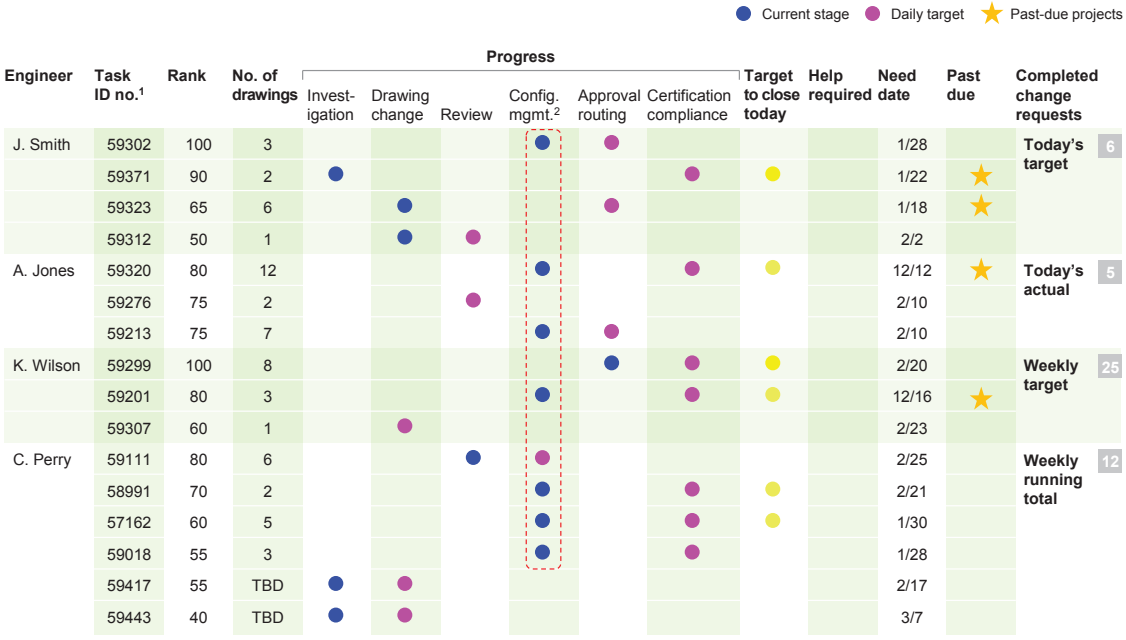
Nevertheless, one company revisited its long-term supplier relationships to achieve savings of 7 percent. A focused, cross-functional team started by segmenting the company's procurement spending into categories based on each component's contribution to total product value and the difficulty of finding suppliers. In many cases, the company had locked in long-term supply contracts even for certain low-value, readily substitutable categories. For these components, the decision was easy: they would go through a rigorous, competitive request-for-quotation process whenever possible. Simple changes, such as grouping parts together more intelligently and ensuring that the appropriate existing suppliers participated in bidding, yielded savings of up to 40 percent for some categories.

Higher-value, harder-to-source components, by contrast, required judicious balancing; many of the contracts would not allow either for greater competition or better cost outcomes unless the parties renegotiated. Depending on the specific component and supplier, the team applied a range of incentives to get suppliers to agree. Expanding the contract's scope to include participation in future product lines or aftermarket service was one option; being creative about provisions for co-marketing or data access was another. From that point, the manufacturer could either expand the bidding pool or work with the incumbent supplier to find design, manufacturing, and supply-chain changes that would reduce both parties' costs.

Reduce engineering/certification costs. Although regulatory requirements make any change to an aerospace product more expensive, manufacturers can find successful strategies at each link in the value chain. For cost-cutting ideas that seem too small to warrant recertification, a large Tier 1 supplier bundles them into a single project requiring just one review. And an airframer revamped its design, change management, and test processes so that they operated as if part of a factory—reducing test time by 30 percent.

A third aero company successfully applied lean-manufacturing methods to its engineering organization, which had a year-long

Exhibit 3 Performance boards help managers detect blockages and coordinate work.



1 Each task gets a number and a priority rank.
2 Configuration management. Blockages are easy to see: configuration management has many tasks that must move forward to meet today's targets.

backlog of change requests, a history of blown budgets and timelines, and a poor reputation internally. Adopting standard lean-management practices—such as performance boards showing the status of every task in the organization, its priority, the deadline, and the next steps to completion—helped coordinate specialists who previously worked in isolation from one another. As Exhibit 3 shows, work-flow blockages became visible, so managers could move resources as needed. Within four months of launching the changes, engineering productivity doubled, the backlog dropped by 40 percent, and the engineers had completed six times as many projects as in the entire previous year.

Challenge specifications. In both defense and civilian programs, buyers' specifications are often so overwhelmingly detailed they seem to defy questioning. But questioning is exactly what manufacturers must do, not only at the beginning of the program but also throughout its course as technology, market conditions, and the needs of end users (whether military personnel or civilian passengers) change.

In many cases, fear of antagonizing customers causes manufacturers to hesitate needlessly when it comes to suggesting even well-justified changes. But so long as the manufacturer can make an overall business case that meets the customer's needs, the changes can often win the customer over. In one business-aviation program, for example, when engineers suggested cost-saving avionics modifications, salespeople were adamant that customers would not be willing to change. But conversations with pilots showed that they were actually quite open to the new system. The revised avionics ended up saving 18 percent compared to the original design.

New strengths, new solutions

Executing cost-reduction plans well—and sustaining the improvement over time—will typically require a company to strengthen important capabilities, both technical and commercial. Many are already present within the company but not delivering the results they could, while others will need to be built from scratch.

Technical proficiency

On the technical side, these skills include better teardown practices and a more rigorous implementation of lean-manufacturing concepts.

Building up on tearing down. For everything from mobile phones to motor homes, manufacturers usually rely on teardowns as a critical source for understanding important design trade-offs, comparing competitors' design choices, and assembling cost data. A cross-functional team tears the product apart, revealing everything from assembly processes to choices of material. The assembled experts can then build a better picture of the decisions that the torn-down product's manufacturer made.

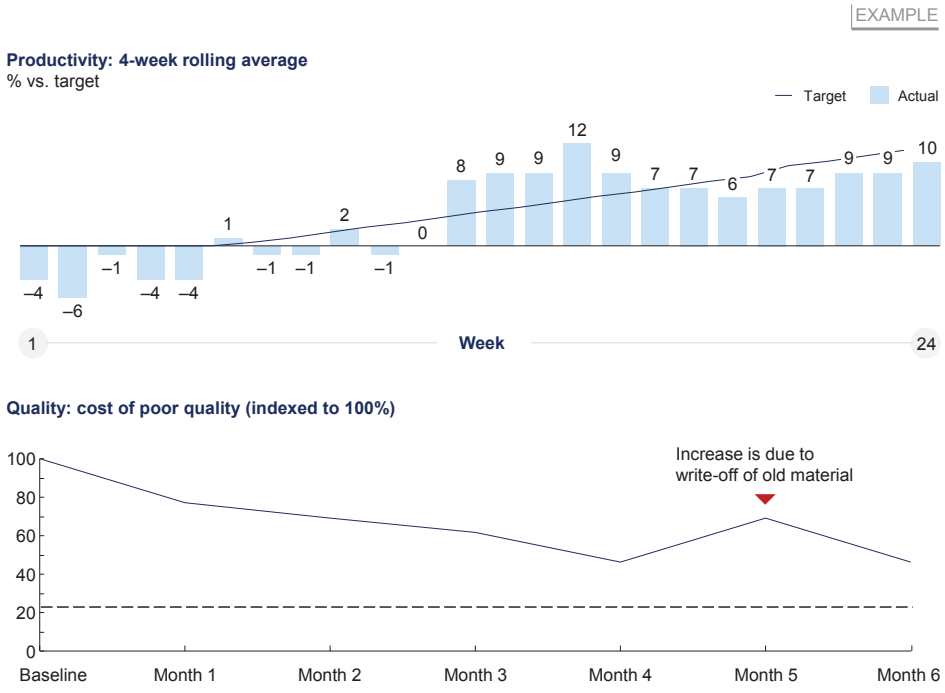
In aerospace, of course, a traditional teardown of an entire product is often cost prohibitive or materially impractical. As a result, we have rarely seen them systematically pursued. But one manufacturer recognized that the value of a teardown comes not from the physical process of disassembly but from the questions the team asks: Why is it this way? What are the cost drivers? What can be eliminated? If our competitor can do that, what else could it do?

The manufacturer therefore conducted teardowns in a completely different way. For some components, the team asked the same questions during a site walk-through—whether at a supplier, a parts warehouse, the company's own manufacturing floor, or in situ on a finished product. When a walk-through was not feasible, the company followed a conference-room-based model in which the product was not even present. Instead, the team conducted its review using photographs, computer-aided-design models, value-stream maps, and bills of material. The combination of teardown approaches led to innovative design changes that reduced total costs by 5 to 15 percent.

Leaning in. Several aerospace players have also logged significant gains by taking a fresh look at their manufacturing processes, with particular attention to how well they are applying the lean-management ideas that many adopted in years past. Often they discover that the full potential has not been achieved, revealing an opportunity to improve simply by enhancing current efforts.

One aerospace player was fairly typical in that at first glance, its lean management appeared healthy: teams were using many of the standard tools, such as value-stream mapping, white boards for metric tracking, and daily problem-solving huddles. Closer examination found that the whole was less than the sum of the parts. Only one product line had truly effective performance management; quality and root-cause problem-solving practices were spotty everywhere; and there was little skill building for frontline leaders. Filling these gaps helped the company increase productivity by more than 10 percent, while the total cost of poor quality (via write-offs, for example) fell 60 percent (Exhibit 4).

Exhibit 4 Over time, cost management leads to improved productivity and quality.



Commercial competencies

Technical capabilities alone, however, can address only part of the total cost equation. The rest will depend on the company's ability to negotiate effectively, especially with its vendors. To that end, investments in advanced procurement analytics—clean-sheet sourcing and total-cost-of-ownership (TCO) models—are highly promising.

Clean sheets, cleaner results. The basic idea behind clean-sheet costing is simple, if demanding. Starting from a bill of materials for an item, the goal is to map every step in the production process for every component—not just the materials, equipment, and people required but also overhead costs on a function-by-function basis. Each calculation is adjusted for performance variables such as the level of equipment utilization, the impact of alternative-staffing models, or the different possible yield rates. The resulting picture lets a manufacturer estimate its suppliers' costs and compare them against the lowest that would be possible.

One civilian airframer successfully used this analysis to recast its dialogue with suppliers from "What is your price?" to "How could your costs be lower than they are now?" Through extensive negotiations, the manufacturer collaborated with certain suppliers on a series of design and manufacturing changes that reduced costs for both sides. In parallel, the manufacturer restructured several internal supply-chain and quality processes as well. The total impact of the changes was a 12 percent cost reduction in thetargeted categories.

Total commitment to total cost of ownership. For components that feature in complex supply chains (or have notable aftermarket repair or replacement requirements), an old standby—the TCO model—can be similarly useful. But as often as aerospace companies embrace TCO in their decision making, relatively few have taken the steps necessary to quantify it meaningfully. Without that second step, an organization cannot fully understand the complex interplay among manufacturing, supply-chain, and life-cycle costs or assess their implications for the product or the various parties involved.

Armed with this detailed information, however, companies can make very different decisions about the design of their end-to-end supply chains, the individual suppliers they choose, and how they structure their contracts. At one manufacturer, a more sophisticated TCO model allowed the management team to identify a set of materials that appeared to be cheaper than alternatives, but whose special handling requirements and difficulty in assembly created significant hidden costs. Switching to materials that were actually more expensive up front yielded a 13 percent net savings.

Making it sustainable

For the improvements described above to endure, *how* the transformation proceeds will matter at least as much as *what* the organization decides to transform. In industries such as aerospace that rely heavily on specialized knowledge, change can be unusually difficult; experts are often more invested in current work patterns than generalists tend to be, and they are more likely to be skeptical about new options.

Aerospace organizations have succeeded by adhering rigorously to a few basic change-management precepts. They make sure their leaders are engaged; the top team's willingness to be a role model for the rest of the organization is likely to be decisive in persuading others to follow. They foster a broader view of capabilities, encouraging people to build on their functional or technical expertise by rewarding thoughtful risk taking and questioning. And they follow a rigorous process discipline, setting clear targets, using standard vocabulary and project templates, and enforcing an operating rhythm for progress reviews.

With aerospace facing its tightest conditions in decades, market realities are forcing a deep realignment of the industry's costs. Those players that see better cost control as a fundamental business problem requiring an enterprise-wide solution will be in the best position to seize the advantage in the coming years.

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