Recapturing value in aerospace

Know your suppliers’ costs and collaborate to lower them
**Contacts**

**Chicago**

Eric Dustman  
*Partner*  
+1-312-578-4740  
eric.dustman@strategyand.pwc.com

**DC**

Joseph Martin  
*Partner*  
+1-703-682-5720  
joseph.martin@strategyand.pwc.com

Raman Ram  
*Principal*  
+1-703-682-5860  
raman.ram@strategyand.pwc.com

**Florham Park**

Randy Starr  
*Partner*  
+1-973-410-7604  
randy.starr@strategyand.pwc.com

**Los Angeles**

Jono Anderson  
*Principal*  
+1-424-294-3736  
jono.anderson@strategyand.pwc.com

**About the authors**

**Joseph Martin** is a partner with Strategy& based in Los Angeles. He leads the firm’s West Coast aerospace and defense practice and specializes in operational improvement.

**Eric Dustman** is a partner with Strategy& based in Chicago. He focuses on operations transformation, including strategic sourcing, manufacturing, and supply chain.

**Jono Anderson** is a principal with Strategy& based in Los Angeles. He specializes in competitive strategy and identifying the capabilities necessary to manage complexity, technology, and operational and organizational performance.

**Raman Ram** is a principal with Strategy& based in DC. He specializes in growth and competitive strategy, supply chain, and operational improvements for aerospace and defense companies.

Strategy& senior associate David Schaar and associate Kevin Hannegan also contributed to this report.

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For the last 15 years, aerospace OEMs and system providers — including airframers and major subsystem manufacturers — have been steadily losing power to their suppliers. This has eroded their profits and is not a sustainable situation for the long term — we believe things will have to change. To recapture value, OEMs and system providers can act unilaterally, but the solution is more likely to be successful and sustainable when they work in collaboration with suppliers to find a win-win solution, one that ultimately leaves both parties better off. For their part, suppliers need to be cognizant of the dynamics of the supply chain ecosystem, their value proposition to OEMs and system providers, and their cost position in the marketplace, but in this Perspective, we describe the situation from the OEM and system providers’ point of view.

Depending on the product being sourced and the associated supply market structure, OEMs and system providers are faced with three strategic options to recapture value: (1) threaten to defect to alternative suppliers; (2) collaborate with suppliers to jointly reduce costs; or (3) pursue longer-term strategies such as “designing out” the parts or components.

The right strategy for a specific OEM or system provider depends on the dynamics of its supply chain, the amount of excess profits, if any, that its suppliers are earning, and the nature of the supply chain relationship. Even in a market segment with significant potential for driving a better deal, success will depend on having a clear grasp of the facts and — even more important — anticipating the supplier’s responses before dialogue gets under way. OEMs and system providers must be resolute. The good news is that they have considerable negotiating power. But they need to wield it wisely.
For most of the last 15 years, airframers and major subsystem providers have been on the wrong end of what has sometimes seemed like a zero-sum game with their suppliers. Prices have gone up, and suppliers’ negotiating power — along with profits — has risen as well. The trend has been more pronounced in some areas of the supply chain than others, but on the whole, OEMs and other upstream players have found themselves capturing a declining portion of the industry’s available profits (see Exhibit 1, next page).

This isn’t destiny. OEMs and system providers have the power to recapture some of the value they’ve conceded, by working with their suppliers to reduce costs and, if necessary, with switching strategies. In some cases, the mere threat of switching may be enough to prompt price concessions. To do any of this, however, OEMs and system providers need to become better at estimating what the sourced parts and assemblies should cost — a foundational capability that has atrophied in many OEMs and system providers. This does not have to be a zero-sum game. OEMs and suppliers can work together to jointly maximize long-run economic returns.
Exhibit 1
Profit trends for aerospace OEMs and their suppliers

<table>
<thead>
<tr>
<th>Year</th>
<th>Airframer</th>
<th>Supplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td></td>
<td></td>
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<tr>
<td>2002</td>
<td></td>
<td></td>
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<tr>
<td>2004</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: Economic profit = accounting profit – (assets * WACC); WACC = 7%; assets = property, plant, and equipment, plus financial assets and other assets in balance sheet. Commercial airframers include Airbus Commercial, Boeing Commercial Airplanes, Bombardier Aerospace, Cessna, Embraer, Hawker Beechcraft. Suppliers include only commercial aerospace-related businesses of the following companies: Alenia Aermacchi, Barnes, B/E Aerospace, Dover, GE, GKN, Goodrich (Nacelles & Interior Systems), Goodrich Landing Gear, Honeywell, Meggitt, Parker Hannifin, Precision Castparts, Rockwell Collins, Rolls-Royce, Safran, Spirit, Thales, Timken, TransDigm, Triumph, UTC, Woodward, Zodiac. Source: Company 10-Ks; Capital IQ; Strategy& analysis
Aerospace OEMs and system providers’ ability to make *should-cost* estimations has suffered due in part to larger shifts in the industry. Overall, these companies’ attention has been diverted toward integration and away from core manufacturing and supply chain functions. With an increasing number of components and assemblies being outsourced, focus has been redirected toward actual and prospective new rivals, especially in emerging markets. As a consequence, procurement staffs have been paying more attention to transactional activities and less to developing critical capabilities such as should-cost estimating. Some aerospace companies mistakenly perceive (perhaps hope) that advanced should-cost estimation capabilities can be purchased via investment in off-the-shelf software; in reality, these tools have inherently limited capabilities that are unable to question the validity of the output. As a result, OEMs and system providers are vulnerable to overpaying, whether the problem is an inefficient supplier or an opportunistic one looking to exploit the absence of economic transparency.

Just how bad has it gotten? *Exhibit 2 (next page)* shows an actual case in which an OEM was paying US$12,000 for a metal-forged part that should have cost $971 — less than one-twelfth as much. High labor costs and inefficiencies within the supplier were part of the problem. Yet even allowing for such inefficiencies, the part should have cost about $7,100. The OEM didn’t have the capability to see what was happening and could not force a change.

The lack of transparency about costs would be an impediment to OEMs at any time, but it is especially so now, as the aerospace industry goes through structural change and the large commercial aircraft duopoly of Boeing and Airbus is likely to be challenged by the expected entry of Bombardier, Irkut, Comac, and Embraer.
Exhibit 2
Should-cost buildup of a titanium machined part, estimate and actuals: Case example

<table>
<thead>
<tr>
<th>Category</th>
<th>Estimate (in $)</th>
<th>Actual (in $)</th>
<th>Percentage Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>$750</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct labor</td>
<td>$80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indirect labor</td>
<td>$40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depreciation</td>
<td>$30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tooling</td>
<td>$27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy</td>
<td>$11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overhead</td>
<td>$33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Efficient producer</td>
<td>$971</td>
<td></td>
<td>1,136%</td>
</tr>
<tr>
<td>Process inefficiencies</td>
<td>$1,400</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High labor</td>
<td>$1,008</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor utilization</td>
<td>$2,820</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profit</td>
<td>$930</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inefficient producer</td>
<td>$7,129</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Price paid</td>
<td>$12,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Strategy& analysis
Not all of the shift in power away from OEMs and system providers and toward suppliers is due to a poor understanding of the drivers of suppliers’ cost structure. Some aerospace supply markets are genuinely constrained, often as the consequence of deft moves by market leaders (such as Precision Castparts’ acquisitions in the area of forgings). In other cases, OEMs have made the tactical decision to cede a huge amount of intellectual property to select suppliers in specific component and subsystem areas.

A variation on this situation is when an OEM or system provider, perhaps in an effort to reduce supply chain complexity or benefit from some scale advantages, decides to buy 100 percent of a critical component or assembly from a single vendor, choking off competitors. Either way, the end result is the same: a supplier with largely unchecked pricing power.

In sum, the imbalance is due in some cases to OEMs and system providers not understanding supply chain inefficiencies, and in other cases to suppliers exploiting pricing because of real or perceived power. Some of these power imbalances can’t be corrected in the near term, and some are in areas that do not materially affect an OEM’s profitability or sustainability anyway. However, other supplier–OEM imbalances can make a material difference and should be corrected. An OEM needs to know which is which, prioritize, and formulate a plan for recapturing some of the value that has slipped away.

One of the challenges is knowing where to start. For example, a single aircraft can easily have 3 million individual parts, 50,000 subassemblies, and hundreds of suppliers. Analyzing everything can be a daunting task, and it’s no wonder that many OEMs and system providers have shied away.
Segmenting the supply base

For OEMs and system providers, determining how best to address supplier relationships becomes substantially easier once the direct sourcing spend and supply base are segmented appropriately. The first part of the segmentation involves identifying all of the industry standard parts or products and separating them from the parts requiring customized designs or processes.

Standard parts include components that are available through catalogs (such as bolts and washers), as well as other raw materials that must be bought off-catalog. They typically represent a relatively small percentage of OEMs’ and system providers’ materials costs and aren’t our focus here.

The primary opportunities lie in customized parts, which account for a larger share of OEMs’ and system providers’ materials costs and require significantly more sophistication to benchmark and manage. To isolate which customized costs they might be able to reduce, OEMs and system providers should start by segmenting materials supply base relationships along two dimensions: relative economic performance and supplier power.

Relative economic performance compares the economic profit\(^1\) captured by suppliers in a given market with that of their customers. Supplier power expresses the concentration of suppliers to customers in a market as a ratio.\(^2\) A high ratio of supplier market concentration to customer market concentration, all other things being equal, denotes a market where suppliers have greater power. A low ratio indicates a market where suppliers have relatively less power.
Exhibit 3 (next page) shows this analysis for one airframer, with some of its suppliers plotted by relative economic performance and supplier power. The key for this airframer — indeed, for any organization doing the analysis — is to examine the suppliers in the upper left quadrant, which have relatively little negotiating power but still earn outsized profit relative to the airframer. Supplier A is a particularly acute case. The airframer should consider restructuring relationships in this quadrant.

The analysis can be done at any level along the supply chain between a customer and its suppliers (for example, an airframer analyzing subsystem and assembly suppliers, a subsystem provider analyzing its suppliers, or a Tier One supplier analyzing Tier Two and Three suppliers).
Exhibit 3
Segmenting the supply base: Case example

Bubble size represents spend at supplier

In reality, several markets have lower supplier power than perceived

OEMs perceive most markets to have high supplier power

Relative economic performance
(supplier EP minus customer industry EP)

High

Supplier A

Excess value captured by supplier A

Low

Low supplier power

Supplier power ratio
(supplier industry HHI divided by customer industry HHI)

High supplier power

Range of acceptable economic profit

- Castings/forgings
- Mechanical components
- Large commercial engines
- Aerostructures (small)
- Avionics
- Aerostructures (large)

Note: HHI = Herfindahl-Hirschman Index (a measure of market concentration). EP = economic profit. Source: Company 10-Ks; Capital IQ; Strategy& analysis
Finding a solution

There are three general approaches that OEMs and system providers can use to get a more attractive and more sustainable deal from suppliers of specialized parts. Where the supplier falls on the continuum of power and economic profit determines the tactic (see Exhibit 4, next page).

1. Threaten to switch suppliers (and follow through if necessary)

In markets where supplier power is low and suppliers capture excess profits, threatening to switch — or actually switching — is the most promising tactic. The threat should be triggered by a supplier’s unwillingness to lower prices to a reasonable level requested by the OEM or system provider or agree to a ceiling on escalation rates (informed by should-cost analysis). If the supplier doesn’t demonstrate flexibility in these areas, it is time for the OEM or system provider to pursue a switch option.

A couple of caveats: This approach is possible only if the OEM or system provider has excellent should-cost capabilities — and knows where the supplier’s economic limits end and its opportunism begins. Also, only credible threats are relevant — the OEM must be willing to follow through on a threat to switch. It may help if the OEM or system provider has already established a precedent by dropping some suppliers, signaling to the balance of the supply base that its threats are to be taken seriously.

The biggest barrier to implementing this approach is the perception of high switching costs, often rooted in the OEM or system provider’s own organization. Often, new parts that go into commercial airplanes must be requalified — that is, they must meet regulatory standards for use in an airplane. A second cost of switching involves tooling — there is often an initial investment in plant equipment that the new vendor must make, and the OEM or system provider typically helps cover some of those costs. A third major switching cost is substantiation, ensuring that the new
supplier has the requisite processes and systems in place or, if not, can take corrective action.

Though switching costs can legitimately be high, OEMs and system providers often overestimate them, sometimes by an order of magnitude. Even in a low-rate production environment, the business case for switching to alternative suppliers is attractive given the price concessions that can be gained even after factoring in switching costs. In addition, it may be possible to reduce switching costs in some cases by requalifying several components in a combined event. For instance, the process of requalifying a critical part—such as a fuel pump—may involve a test flight. But if the OEM or system

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**Exhibit 4**

**General value capture framework for customized parts**

<table>
<thead>
<tr>
<th>Relative Economic Profit</th>
<th>Supplier power ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>(supplier EP minus customer segment EP)</td>
<td>(supplier HHI divided by customer HHI)</td>
</tr>
<tr>
<td>High 25%</td>
<td>Low supplier power</td>
</tr>
<tr>
<td>20%</td>
<td>0.0</td>
</tr>
<tr>
<td>15%</td>
<td>0.5</td>
</tr>
<tr>
<td>10%</td>
<td>1.0</td>
</tr>
<tr>
<td>5%</td>
<td>1.5</td>
</tr>
<tr>
<td>0%</td>
<td>2.0</td>
</tr>
<tr>
<td>-5%</td>
<td>Low supplier power</td>
</tr>
<tr>
<td>-10%</td>
<td>Supplier power ratio</td>
</tr>
<tr>
<td>-15%</td>
<td>High supplier power</td>
</tr>
</tbody>
</table>

1. Threat of switch, and potential actual switch
2. Joint cost reduction
3. Long-term strategies (e.g., design-out, defensive, or accept as is)
4. For OEM, do nothing, but monitor supplier health

Note: Where company segment information is not publicly available, corporate financial data was used to calculate economic profit, which may not be indicative of segment economic profit. HHI = Herfindahl-Hirschman Index (a measure of market concentration). EP = economic profit. Source: Company 10-Ks; Capital IQ; Strategy& analysis
provider can test the new fuel pump in the same test flight it is using to requalify an igniter, the economics for each part become more appealing.

Another consideration is that OEMs and system providers often purchase multiple components or assemblies from the same supplier. If this is the case, an OEM that is thinking about switching one high-value component to a different supplier may want to analyze the economics of switching all parts to alternative suppliers. After all, there is risk that the supplier under scrutiny might raise prices on other parts to penalize the OEM or system provider for pulling an important piece of business. This is one of the scenarios that an OEM or system provider should “game out” before threatening or starting a partial move away from a multicomponent supplier.

2. Collaborate for joint cost reduction

When sourced components or assemblies come from a supplier whose economic profits and power are lower than the OEM or system provider’s, joint cost reduction is very often the optimal approach. OEMs, system providers, and suppliers can work together to optimize the cost of the sourced parts, often with joint benefits.

Joint cost reduction is based on the reality that there are policies, activities, and practices on both the OEM and supplier sides that introduce inefficiencies into the supply chain, driving up product cost and consequently leading to higher prices. For instance, the OEM or system provider’s ordering and planning schedules may be sporadic, and the number of parts it buys may vary widely from order to order. For its part, the supplier may have high overhead. Indeed, these two issues may be related: The supplier may have overhead in place specifically to meet the OEM or system provider’s most demanding and difficult-to-predict requests. By committing to a more predictable schedule of orders, the OEM or system provider can enable the supplier to reduce the amount of overhead and inventory it carries.

There are other steps the OEM or system provider can take to help the supplier lower its costs. Among them are working with the supplier to increase its production efficiency, issuing long-term contracts to help the supplier take advantage of scale and increase its utilization rate, and offering the supplier a contract on new programs in return for price
concessions and more modest escalation rates. However, to pursue joint cost reduction, the OEM or system provider needs to know what the “ideal cost” of the part should be, given raw material, conversion, and overhead requirements. In addition, the OEM or system provider should know the extent to which the incumbent supplier’s cost structure moves the cost of the component or assembly being sourced above the ideal cost.

The idea behind joint cost reduction is that the OEM and supplier both get some benefit from the savings — the relationship is not a zero-sum game after all. Joint cost reduction is a viable and tested approach in markets characterized by tight supply, since switching vendors in such markets often isn’t possible.

It’s worth noting, however, that the amount of collaboration necessary in a joint cost reduction initiative means it can be done only with a few strategic suppliers and by OEMs and system providers with strong should-cost capabilities.

### 3. Adopt long-term integrated strategies

For an OEM or system provider, the most challenging situation involves suppliers of large and highly complex subsystems or assemblies. These supply markets tend to be highly concentrated, with vendors that have substantial intellectual property rights and have gotten more firmly entrenched over the years. The barriers to entry are often quite high. As a result, these markets may not present OEMs and system providers with much of an opportunity to alter the balance of power with their suppliers, at least in the short term.

In the longer term, OEMs and system providers have more options to pursue. For example, they can structure longer-term incentives to work more closely with their suppliers. If that doesn’t prove fruitful, they may have to get more creative, such as shifting to designs that eliminate the need for the assembly, or that would integrate the function of the assembly into a larger subsystem that they design and manufacture themselves. (In doing so, they have to ensure that the supplier’s intellectual property is not violated.) OEMs and system providers can also take steps to affect the broader supply market — for instance, by signaling their intention to invest in new suppliers for a market.
Suppliers have their own points of view and face their own pressures, making it hard for an OEM or system provider to know how a supplier will react to a given negotiating strategy. Probably the worst thing an OEM or system provider can do is threaten to make a change and then back down — such behavior only weakens its position and strengthens that of the supplier. Indeed, it should probably be assumed that a supplier’s first response to a request for a price break will be some form of “no.” If the OEM or system provider sees no alternative to accepting that response, then it should not make the request in the first place.

An OEM or system provider that is committed to the process needs to have a sense of what the supplier might say and a series of responses that will preserve its options. There are collaborative moves an OEM can make, such as offering to begin a joint cost reduction initiative with the supplier, or investing in the supplier. The OEM or system provider also has some adversarial moves at its disposal, including threatening to switch to another supplier, as discussed above.

Suppliers may make adversarial moves of their own. The OEM must anticipate this possibility and have a countermove ready — for instance, initiating the switch of some high-value parts if the supplier doesn’t respond to a threat, and switching all parts if the supplier starts raising prices on remaining parts. This is a classic game informed by economics (see Exhibit 5, next page). If the OEM goes about it in the right way, the only question should be how much economic benefit it recaptures from its efforts — not whether it gets any benefit at all.
*Exhibit 5*
Sample OEM decision tree for engaging suppliers to pursue joint cost reduction

Highlighted lines indicate preferred/most probable path

Source: Strategy& analysis
The imbalance in value capture between aerospace OEMs and system providers and their suppliers didn’t develop overnight, and the situation will not be reversed overnight. Capabilities need to be built, strengthened, and reinforced. This is a journey rather than the flicking of a switch — with work to be done in the areas of supplier and spend segmentation, should-cost estimation, and switching-cost analysis. But for OEMs that have the necessary discipline, it is a journey that can lead to higher profitability and an improved competitive position in the aerospace industry’s coming growth phase.

For their part, suppliers have to be cognizant of the dynamics of the supply chain ecosystem. The need to understand how they fit in a system provider’s supply chain, their value capture, and cost positioning with respect to the market will be more critical than ever. Suppliers that understand this and act accordingly will be positioned to be competitive and, ultimately, advantaged relative to peers. This will define the intelligent supplier — stay tuned for more.
1 “Economic profit” factors in the weighted cost of capital. This makes it, in some senses, a better gauge of profitability for a product or line of business.

2 Customers have several options for determining how much power suppliers have in a given market. This example uses the Herfindahl-Hirschman Index to measure the size of companies in relation to an industry, and to approximate the amount of competition between them. It is defined as the sum of the squares of the market shares of the companies in an industry, with the market shares expressed as fractions.
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