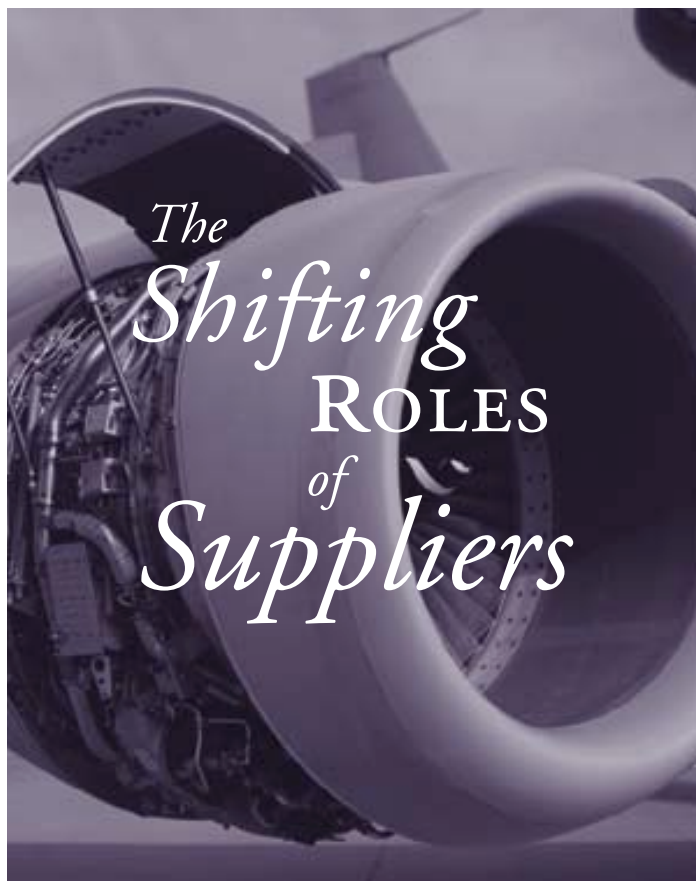


*Restructuring the
Global Aerospace Industry*



Introduction

Aerospace continues to be gripped by a tumultuous and rapid industry transformation. In civil aviation, liberalization and privatization have led to massive consolidation and restructuring, altering relationships between airlines and airframers. Before September 11, 2001, the industry was already in decline with passenger demand showing the first signs of a downturn. Since then, the existing trends accelerated dramatically. United Airlines, Swiss Air, Sabena and U.S. Airways filed for bankruptcy. In the United States, the airline industry lost US\$8 billion in revenues in 2001 and is expected to lose US\$7 billion in 2002.

The exception, however, is the low-fare segment of the market, which has remained strong. In the same one-year period, several low-fare airlines have enjoyed significant growth. EasyJet, the United Kingdom's no frills airline based at London's Luton airport, boosted revenues by 35 percent. And Ryanair, Ireland's no-frills competitor, has seen its revenues increase by 28 percent in the past year. Southwest Airlines, the United States' low-cost leader, is somewhat of a Wall Street darling these days. Its market capitalization of more than US\$10 billion is twice that of the major carriers combined. Meanwhile, new players such as Germanwings, Germany's first economy airline, continue to enter the no-frills fray.

The low-fare segment is expected to continue to grow. Low-cost airlines, which currently carry 4 percent of all domestic and international passengers within Europe, are expected to increase their carry rates to 12 to 15 percent by 2010 according to a report published in January 2000 by Cranfield University. With airfares at a 15-year low, industry leaders expect consumer demand to become—and remain—more price sensitive.

This low-cost trend has not passed unnoticed by the industry's manufacturing powerhouses. In the United States, Boeing is busily courting Ryanair as a top customer for aircraft purchases. Ryanair purchased 100 of Boeing's 737-800 aircraft, making it Boeing's single largest deal after September 11, 2001. Boeing is believed to have given Ryanair up to a 50 percent discount off its usual US\$57 million per aircraft price tag—a tough number for the OEMs and their supply chains to meet. European jetmaker Airbus was chosen over Boeing to supply discount carrier easyJet with 120 new A319 aircraft, with an option for an additional 120 planes. Stelios Haji-Ioannou, easyJet's former chairman, said Airbus provided the aircrafts at 30 percent less (per seat) than what incumbent Boeing charged before the current crisis.

In the military sector, cost consciousness is also gaining ground. Less government spending on defense combined with new government purchasing policies has slammed the door on cozy relationships between the public sector and private industry. Now, relationships are more profit-minded and there is increasing pressure for consolidation—even across borders. For example, in 2000, EADS, the European Aeronautic Defence and Space Company, emerged from the link up of the French Aerospatiale Matra, Spain's Construcciones Aeronauticas SA and Germany's DaimlerChrysler Aerospace AG. Likewise, the multicultural Thales Group was born from the transformation of the French defense contractor Thomson-CSF.

Today, more European nations recognize the need to consolidate spending as a way to realize sound economies of scale. Parallel programs to produce fighter aircraft such as the Eurofighter Typhoon, France's Rafale and the Swedish Grippen fighter, will soon be history. The need for consolidation will only increase, as the surge in military spending after September 11, 2001—a ray of hope for many defense contractors—will prove to be temporary if the war on terrorism winds down. This pattern has played out consistently after every major war in the 20th century.

As a result, companies in the aerospace industry are rethinking their strategic positions. "I am sure there will be further consolidation in Europe," explained Rainer Hertrich, co-CEO of EADS, to a group of defense industry reporters in Washington, DC. Mr. Hertrich is not alone in his thinking.

A recent A.T. Kearney survey of aerospace executives in Central Europe found that 78 percent expect massive consolidation within the next five years. The upcoming industry restructuring—particularly in Europe—appears obvious. The question is: How should suppliers prepare for, and react to, the restructuring?

This paper discusses the industry restructuring and what suppliers in today's aerospace industry have in common with suppliers in yesterday's automotive industry during a similar industry shakeout.

WATCH THE AUTOMAKERS

The automotive sector may be the blueprint for the developments taking place in the aerospace industry. In fact, many top aerospace companies have hired experts from the automotive industry to advise them, albeit with mixed success.

The two industries have a lot in common. Their products are both highly complex and require significant engineering, manufacturing and supply chain management capabilities. Both products can be broken down fairly easily into major modules and systems, some of which relate mainly to electronics, some to mechanics and some to mechanics. And both industries have a small number of manufacturers that rely on a broad spectrum of suppliers in several tiers—from parts manufacturers and sub-assembly suppliers to system integrators.

Still, there are a few differences. For example, cycle times in the automotive industry (from three to six years) are dramatically shorter than in aerospace, where in many cases products have a production life of more than 25 years. A car may consist of some 7,000 parts, whereas an airplane can consist of up to six million parts. And the 75,000 horsepower that it takes to power a Boeing 747 is far greater than the horsepower needed to run a car. In addition, the automakers have far higher production volumes, which give them a much sharper edge on implementing improvements.

But these differences should not stand in the way of recognizing and building on the similarities.

THE FIRST REACTION MAY NOT BE THE BEST REACTION

In many cases, the first reaction of aerospace

suppliers is to compete in the race for tier one positions—to become tier one suppliers. But considering the sky-high requirements for capabilities and financial backing, this strategy is not necessarily the best. In fact, it may prove smarter to specialize as a sub-tier parts manufacturer. Today, direct suppliers face a crucial strategic decision: try to remain in their current role, pursue a focused system-integrator role, or become parts suppliers of selected segments.

A similar question was uppermost in the minds of automotive suppliers back in the mid- to late-1990s when numerous companies found their primary roles changing. Many suppliers tried to expand their activities to become system integrators, while others pursued opportunities available to indirect suppliers. For some companies, avoiding the additional burdens and costs of the system-integrator role and opting for an indirect supplier role was the strategically wise choice.

Importantly, size alone was not a factor in the decision-making. In the automotive industry, some very large material companies functioned as indirect suppliers, while some smaller specialty suppliers became system integrators. Moreover, relationships were not all simple bilateral links along the chain. Assemblers began to bargain directly with some material suppliers because smaller suppliers lacked the necessary bargaining power. (Recently, aerospace OEMs, including Rolls-Royce, have begun to address this issue.)

Also, during the automotive industry restructuring, system integrators were defined more by their functions and capabilities rather than their exact location in the flow of product to the assemblers. While the supplier that shipped the final system to the assembler was

considered the “system assembler,” the true system integrators could be encountered much earlier in the product flow, perhaps at the electronic component stage or even at the initial material stage.

What separated the system integrators from other suppliers? System integrators assumed responsibility for the execution of most technical tasks in the product chain and coordinated the chain’s technical and operational performance.

TREND WATCHERS SEE SIMILARITIES

A wise person benefits from others’ experience, imitating their more strategic moves and avoiding what, in retrospect, were their critical mistakes or pitfalls. There is a case to be made for scrutinizing certain trends in the automotive industry—looking at the ways in which automotive suppliers reacted to certain conditions—and using those trends to assist decision-making in the aerospace industry. In fact, there are four major trends that support a comparison between aerospace suppliers and automotive suppliers:

Globalization. Companies in the automotive industry were used to buying from their own national suppliers, often encouraged by governments to keep technology and spending in the country. Then the rules of the game changed. Automakers were “encouraged” by economic pressure from foreign competitors to buy from suppliers in other countries. Both assembler and suppliers were challenged to approach global markets and develop global cultures. An A.T. Kearney study at that time (in the mid-1990s) revealed that suppliers that described their companies as system integrators were among the first to expand their production beyond their home countries, while other suppliers were less inclined to expand.

Today, reminiscent of the automakers in the mid-1990s, aerospace suppliers are competing with more efficient rivals in other countries. Suppliers in Asia, Eastern Europe and Latin America are using their reduced cost structures to compete against the incumbent European and North American suppliers. These interlopers work relentlessly to improve their capabilities and skills.

Furthermore, suppliers are under increasing pressure to move their sub-tier businesses to these non-traditional regions in return for large deals—driven somewhat by the growing importance of countries such as China and Russia as customers for aircraft. The larger OEMs are already in force on this battlefield. Boeing has invested more than US\$1.3 billion in cooperative programs in the Russian aerospace industry. Airbus is relying on four Chinese component manufacturers and is in discussions to transfer significant work to China within the next 10 years.

If the automotive industry is any measure, to remain competitive aerospace suppliers must quickly learn to globalize their activities and attitudes, and adjust to the changes demanded by industry restructuring. These include, but are not limited to, meeting increased functional responsibilities, handling often-diverging customer requirements and developing appropriate alliances. The major barriers to competitiveness will be rooted in a general (both individual and organizational) resistance to change, and difficulties in communicating and working together. Insufficient human resources—both in number of people and the skills that they bring to the company—is another considerable hurdle.

Consolidation. The automotive supplier

industry has undergone an impressive and somewhat legendary consolidation over the past 10 years. In 1986, there were more than 30,000 automotive suppliers. By the end of 2003, only 5,000 suppliers are expected to be in business. A recent A.T. Kearney study of automotive suppliers indicates that 36 percent of automotive suppliers today are in fiscal danger due to low equity. Of some 70 North American automotive suppliers studied, nine had their debt ratings downgraded in 2001, while none received an upgrade.

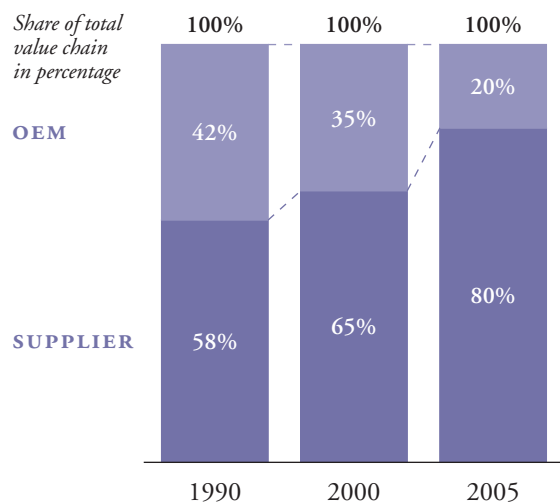
Shifts in the aerospace business environment have led to similar consolidations to cut costs and reap economies of scale. In the United States, for example, rapid consolidation encouraged by the government in the mid-1990s led to the creation of five industry giants: Boeing, Northrop Grumman, Lockheed Martin, Raytheon and General Dynamics. These pace-setting megamergers forced Europe to respond with national consolidation as well. In 1999, British Aerospace and Marconi Electronic Systems merged to form BAE SYSTEMS in the United Kingdom. In France, a variety of aerospace companies, including Hurel-Hispano, Hispano-Suiza and Labinal, are held under the Snecma Group umbrella. EADS, mentioned earlier, was Europe's first major cross-country merger. The U.K. government has decided to relax foreign share ownership restrictions to help facilitate BAE SYSTEMS' and Rolls-Royce's ability to maneuver in a global market. Meanwhile, the sub-tier aerospace supplier market in Europe remains highly fragmented. A 2001 study of the German aerospace supplier industry, conducted by the Ministry for Economy and Technology, found that 91 percent of suppliers have fewer than 1,000 employees.

The next few years should bring a round of worldwide sub-tier merger and acquisition activity—with one in two companies either losing its independence or exiting the market altogether.

Supply chain integration. OEMs in the automotive industry, long considered leaders in role restructuring, were among the first to transfer direct task responsibilities to their suppliers—from system-level integration to modular sourcing. A.T. Kearney research reveals that by 2005, an OEM's share of the total value chain will be almost cut in half—going from 42 percent in 1990 to 20 percent by 2005 (see figure 1).

This restructuring rationalized resources along the industry value chain by shifting various activities such as design, engineering, R&D, and purchasing from assemblers to system integrators. For example, by using modular product design, OEMs were able to reduce the number of suppliers in their portfolio. Ford cut its direct supplier base by 66 percent by changing

Figure 1: 15-year process of vertical integration in the automotive industry



Source: A.T. Kearney

from the model it used to produce the old Ford Escort to a system integrator model, which is used to produce the current Ford Focus (see figure 2). And tiering grew as system integrators sought to simplify their supply chains by focusing on their core capabilities. Some focused on integration and even brand or marketing activities. Bosch, for example, is advertising directly to the end customer.

Reducing the overhead expenditures associated with such activities lowered break-even production quantities and allowed assemblers to serve smaller niche markets profitably. This new industry structure also permitted assemblers to focus their energies on their own core processes as they relinquished responsibility for less central activities to suppliers. Yet, there is a downside. Fewer suppliers with greater responsibilities are in an improved bargaining position.

Today, OEMs in the aerospace industry are setting comparable targets. Many are quickly

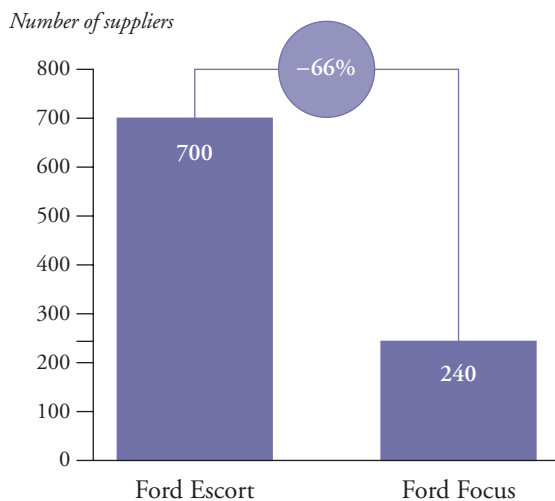
adopting techniques from other industries including automotive, inviting suppliers to take on more responsibility and share risks. Rolls-Royce is leading the way. The aerospace engine giant has already announced six risk-and-revenue-sharing partners for its Trent 900 program, which is developing an 80,000-pound thrust engine that will power the Airbus A380 superjumbo jet at approximately US\$10 million apiece. Volvo, FiatAvio, Goodrich, Hamilton Sundstrand and Honeywell will all participate in the financing and development of the engine. Likewise, Airbus has announced more than 30 risk-sharing partners for the project. Alenia, Eurocopter, Fokker, Gamesa, Labinal and Saab, among others, will cover about 25 percent, or some US\$3 billion, of the project's total non-recurring costs.

Lean manufacturing. Automotive, long considered the birthplace of lean manufacturing, has a great deal of experience to share with the aerospace industry. “Lean thinking” has been highly effective at attacking automakers’ internal costs both in manufacturing and overhead, and has been applied to product development processes to reduce internal process costs. Today, automakers are extending these lean principles to improve performance—aggressively attacking the most important drivers of uncompetitive product cost, inadequate product quality and slow execution speed.

Lean manufacturing is being extended to lean design—and going a step further to effectively address the impact of product design on the cost of the final product.

Aerospace OEMs that recognize the significance of lean thinking have brought in lean manufacturing experts from the automotive industry to share their knowledge. Although

Figure 2: System integrator model reduces supplier base



Source: A.T. Kearney

OEMs in the automotive industry were among the first to transfer direct task responsibilities to their suppliers.

these companies are off to a good start, it will not be easy to transform the unwieldy to lean. For too long, companies in the aerospace industry have relied on government subsidies, allowing them to become notoriously inefficient in their use of working capital. (Even in the civil market, large down payments are still common practice.) Aircraft used to be—and in many cases still is—manufactured in out-of-date workshops similar to those in which automobiles were manufactured in the 1920s. These factors, combined with the repercussions of September 11, 2001, have inflated the industry’s working capital.

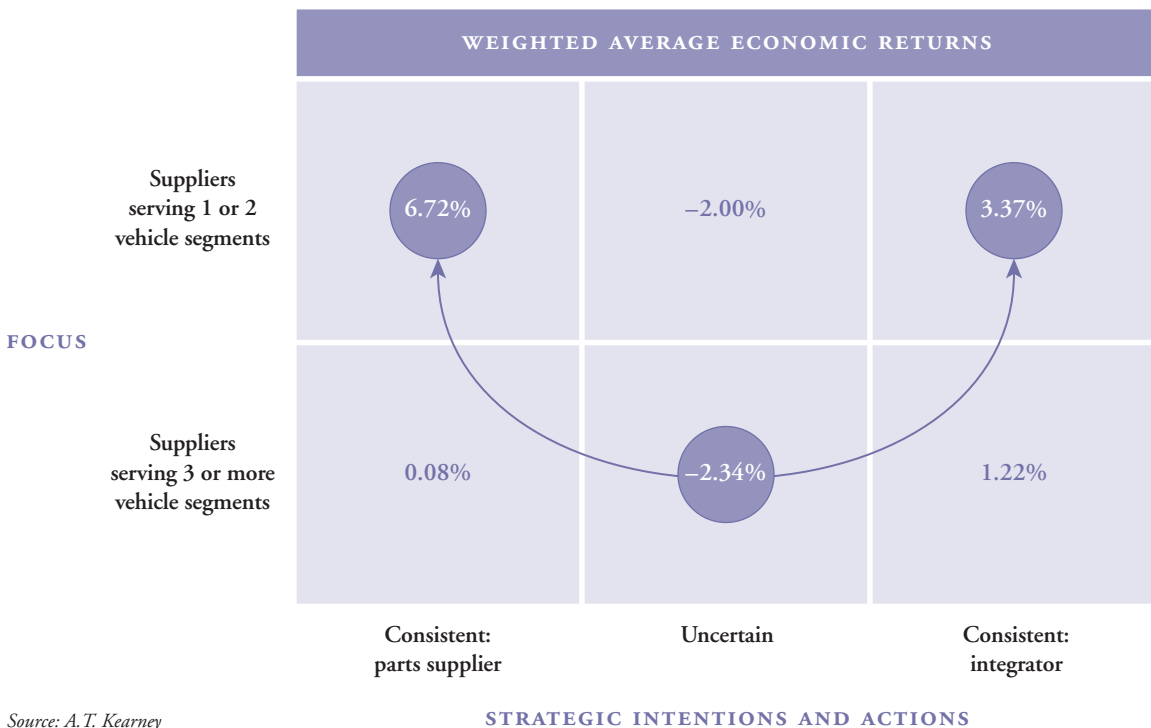
Aerospace companies that address the lean manufacturing issue, and soon, will have the greatest prospects for success, particularly in the

sub-tier supply chain. Working within their lean manufacturing efforts, cross-functional teams can “learn to see” waste and thereby eliminate it to achieve breakthrough and sustainable product improvements and cost reductions.

WHAT AEROSPACE CAN LEARN FROM THE AUTOMOTIVE INDUSTRY

In the automotive industry, the evolution of the supply chain structure was not completely neat and fixed. There was ambiguity in the distinctions among the terms “systems” “modules” “components” and “parts.” While a single fastener was readily distinguishable from an engine, distinctions among the constituent elements of the vehicle were less clear. Many suppliers became mixed types, combining the roles

Figure 3: Supplier performance in the automotive industry (1994 to 1996)



Source: A.T. Kearney

of system integrator and parts manufacturer.

In 1997, an A.T. Kearney study, “The 21st Century Automotive Supply Chain” unveiled different economic returns of the different players in the automotive supply chain.¹ In tracking their chosen roles, parts suppliers with a clear focus on selected vehicle segments achieved the best economic returns, followed by focused system integrators. The worst performers were suppliers trying to be both system integrators and parts manufacturers (*see figure 3*).

The study results are often explained by the fact that the automotive suppliers had limited capabilities. Transforming from a parts manufacturer to a system integrator required building up a wide range of capabilities—from supply chain management to research and development. Most suppliers underestimated the investment that would be required, and had trouble attracting the necessary resources. At the same time, they overestimated the returns on their investments.

Consequently, aerospace suppliers have the advantage of learning from the past mistakes of the automotive suppliers. Those suppliers that understand and vigilantly manage the size and timing of investments required to be system integrators—and that recognize the potential payback—will be among the first to gain a competitive advantage (*see figure 4 on page 8*).

The implications for aerospace suppliers is that small- to medium-size companies should pursue a focused strategy—concentrating on components and parts manufacturing. They will have to exercise clear, world-class cost leadership, however, to defend their niches against competitors. Although today’s top competitors reside in

traditional markets, in the near future new procurement markets, including the Far East and Eastern Europe, will become major competitors.

Medium to large aerospace suppliers, meanwhile, should develop system integration capabilities to survive. If the automotive marketplace is any gauge, before long the only route to business will be through tier one suppliers. Subsequently, and based on automotive experience, larger suppliers have no choice but to compete for this position in the supply chain—either on their own or in joint ventures with competitors. In either case, success will depend on closely managing the investment.

FIVE SUCCESS FACTORS OF A TIER ONE SUPPLIER

According to A.T. Kearney experience in both the automotive and aerospace industries, large suppliers that hope to pursue a tier one role can benefit from the wisdom attained during the restructuring of the automotive industry. In particular, the following five factors may offer guidance:

1. *Take on comprehensive supply chain management capabilities.* The best system integrators build up their capabilities to assume responsibility for managing the sub-tier supply chain. They accept responsibility for the downward flow of information—communicating requirements from the OEMs (for example, airframer or engine manufacturer) to the sub-tier suppliers. Among their responsibilities, system integrators must manage the just-in-time assembly process, monitor and ensure quality, approve suppliers and negotiate best prices with sub-tier parts and components manufacturers.

¹*Economic Return = (Net Operating Profit After Tax – Capital Charges) / Economic Capital Employed*

2. *Accept leading-edge R&D capabilities.*

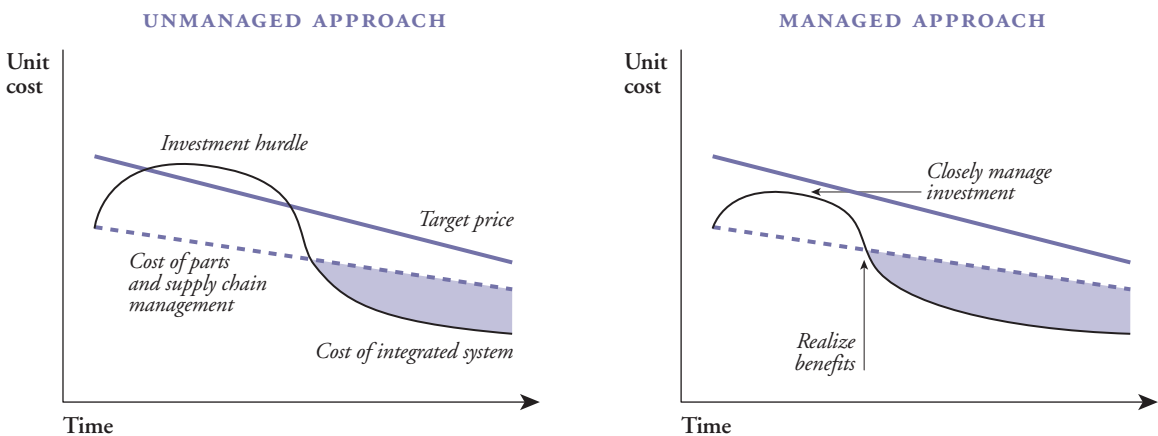
During the restructuring of the automotive industry, resources were rationalized along the industry value chain. Various activities such as design, engineering, R&D and purchasing shifted from assemblers to system integrators. The same will undoubtedly occur in the aerospace industry, beginning with the transfer of R&D to system integrators. In fact, being able to contribute significantly in the development phase of the product will become a key differentiator for tier one system integrators. By being involved in the early phases of a new program development, suppliers increase their chances to actually win the business. Such involvement also provides the supplier with an opportunity to influence the design of the product to meet its own specification and manufacturing needs, which will help to ensure the lowest possible cost. Further, it becomes more difficult to replace a supplier with such capabilities.

3. *Focus on selected products and modules.*

Tier one suppliers should concentrate their efforts on selected, and ideally related, segments. This way, they can optimize the best use of their resource pool—including their own engineering force as well as the workforce of their sub-tier supplier base. Those companies that extend too far—over a range of modules—will be unnecessarily stretched to their limits, both financially and in terms of their human resources. Remember the automakers. The economic returns of suppliers considered “mixed types” were well below the returns of both system integrators and parts suppliers that focused on selected segments.

4. *Establish structural independence from parts suppliers to provide unbiased sourcing decision-making.* A common mistake of many system suppliers is to stay primarily within their own corporate network, meaning they work only with their own components suppliers and parts manufacturers. The consequences

Figure 4: Managing investments. What is required to be a system integrator?



Source: A.T. Kearney

of such favoritism include a lack of competitive rigor. The overall attractiveness of system suppliers suffers as they are perceived to be less competitive than suppliers that spread their business among an array of components and parts manufacturers.

Clearly, system suppliers that choose their partners objectively, without regard for corporate relationships, will win more deals. These suppliers expose their own components and parts suppliers to market competition and refrain from giving them special privileges. Furthermore, they are first to challenge the acquisition of a parts manufacturer. To survive in this market, sourcing decisions for all parts of the system must be made autonomously.

5. Build critical size to meet requirements for financial security and investments. In passing on responsibilities to system suppliers, OEMs become exposed to significant dependencies and related risks. Therefore, the finan-

cial security of a system supplier will always be a key criterion when awarding tier one business. The discussions will be driven by product liability issues, the ability to survive a major crisis and the capacity to defend against a potential takeover. Furthermore, tier one suppliers must be able to invest in the latest electronic communication and collaboration technology, otherwise it will become far too expensive for OEMs to deal with them.

OEMs such as Rolls-Royce and Airbus are among the leaders now sharing ever-growing investments with their top suppliers. Airbus, for example, is investing close to US\$12 billion in the A380 program and plans to have suppliers Alenia and GKN Westland Aerospace, among others, finance about 25 percent of the investment. GKN is seeking investors to cover around US\$50 million of its investment. Clearly, only companies with significant financial backing will be able to compete for such programs.

Conclusion

The aftermath of the September 11, 2001, terrorist attacks combined with post-merger integration efforts among the large OEMs will continue to fuel the restructuring of the aerospace industry. Suppliers that succeed in the emerging supply chain structure must move quickly to determine their strategy. Those suppliers that are first to address the critical issues surrounding the restructuring will have access to the largest number of opportunities. But only if they do not lose their focus.

The top suppliers in the new aerospace industry will never underestimate the effort and investments required to become a tier one system integrator, and meticulously manage each step in the ongoing process. Although many suppliers today seem to understand parts of the message, the trouble is most companies consider themselves buyers rather than sellers. In the future, the restructuring of the supply base will lead to a more “pyramidal” structure with fewer companies and greater responsibilities for those companies. The question is: Which well-known suppliers will merge and disappear from the roster, and which lower-tier suppliers will be eliminated?

Over the next 10 years, up to every second aerospace company will likely lose its independence or exit the market completely. In the end, however, the aerospace industry will be better positioned for the future. Those companies that survive will be more productive and competitive, and will possess a highly improved sense of affordability.

A.T. Kearney is an innovative, corporate-focused management consulting firm known for high quality, tangible results and its working-partner style. The firm was established in 1926 to provide management advice concerning issues on the CEO's agenda. Today, our 5,000 employees worldwide serve the largest global clients in all major industries. A.T. Kearney's offices are located in 59 cities in more than 35 countries in Europe, Asia Pacific, the Americas and Africa. A.T. Kearney is the management consulting subsidiary of EDS, the leading global services company. EDS provides technology strategy, implementation, business transformation and operational solutions.

AMERICAS | Atlanta | Boston | Buenos Aires | Caracas | Chicago | Cleveland | Detroit
Los Angeles | Mexico City | Miami | Minneapolis | New York | Plano | San Diego
San Francisco | São Paulo | Silicon Valley | Stamford | Toronto | Washington, D.C.

EUROPE | Amsterdam | Athens | Berlin | Brussels | Copenhagen | Düsseldorf | Frankfurt
Geneva | Helsinki | Istanbul | Lisbon | London | Madrid | Milan | Moscow | Munich
Oslo | Paris | Prague | Rome | Stockholm | Stuttgart | Turin | Vienna | Warsaw | Zurich

ASIA PACIFIC | Bangkok | Beijing | Hong Kong | Jakarta | Kuala Lumpur
Melbourne | New Delhi | Seoul | Shanghai | Singapore | Sydney | Tokyo

AFRICA | Johannesburg

For information on obtaining additional copies, reprinting or translating articles,
and all other correspondence, please contact:

A.T. Kearney, Inc.
Marketing & Communications
222 West Adams Street
Chicago, Illinois 60606 U.S.A.
1 312 648 0111
fax: 1 312 223 6759
email: insight@atkearney.com
www.atkearney.com

Copyright 2003, A.T. Kearney, Inc. All rights reserved.

No part of this work may be reproduced in any form without written permission from the copyright holder.
A.T. Kearney® is a registered service mark of A.T. Kearney, Inc. Executive Agenda® is a service mark of A.T. Kearney, Inc.
A.T. Kearney, Inc. is an equal opportunity employer. EDS® is a registered mark of Electronic Data Systems Corporation.

ATKEARNEY®
an EDS company