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Soaring or stalling
Can aircraft manufacturers prevent rate ramp-up problems?

A PwC white paper

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At a time of soaring order books and rapid production rate ramp-up, supply chain risk is top of mind for aircraft manufacturers. When PwC looked at 12 key commercial and defence aerospace growth programmes, we found that a fifth (21%) of suppliers are not financially ready to support the high ramp-up ahead of them. Dirk de Waart, leader of PwC's PRTM Commercial A&D Group, discusses the findings and explains how PwC is using an approach, taken in part from the world of private equity M&A, to help companies pinpoint risk and prevent supply chain disruption.

High production rate ramp-up will be needed across much of the aerospace and defence (A&D) sector. Both the leading civil aerospace manufacturers—Boeing and Airbus—have announced a series of record deals for their new generation of commercial aircraft. Military programmes such as the Joint Strike Fighter and Tanker are also ramping up in the next five to ten years. But big rate increases also mean pressure on the supply chain, leaving programmes vulnerable to supply chain delay or failure. Aerospace companies and their leading tier-one suppliers are very conscious of the potential problems, particularly in the light of the major delays that have affected recent programmes. The question is what is the best way of preventing future problems?

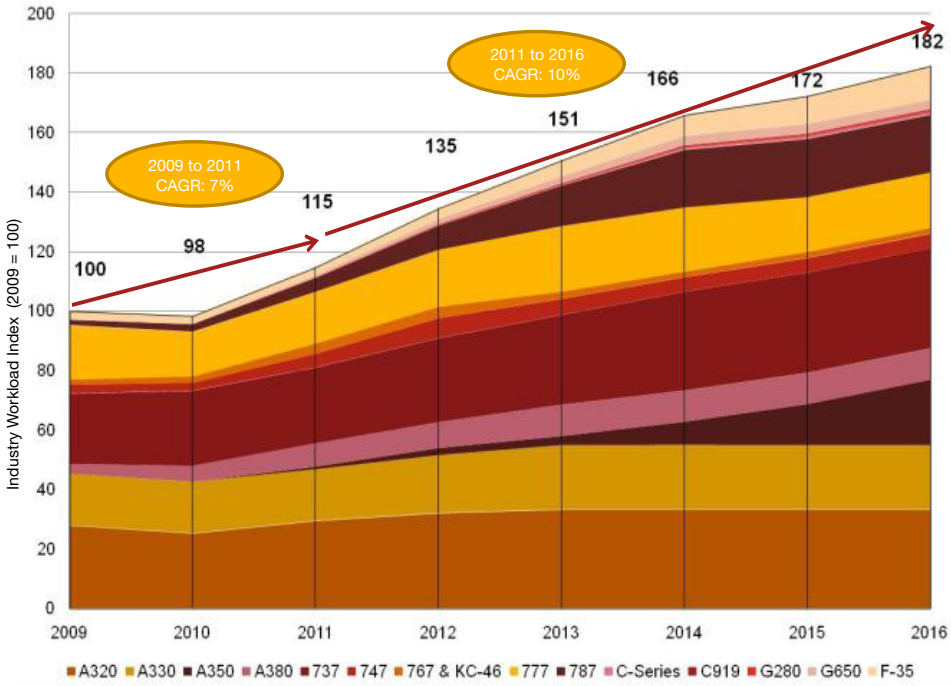
The question is even more pertinent at a time when world events have caused upheaval in many industries. The Japan earthquake and tsunami, as well as floods in Thailand, led to widespread supply chain disruptions. Many parts of the world continue to be witness to unprecedented social and political unrest. Outside events in the form of natural disasters, geopolitical change and industrial relations interruptions can have far-reaching supply chain consequences. The natural disasters of 2011 led to shortages in critical automotive and technology components. Similarly, man-made events such as port labour disputes, as have occurred recently in the US, can also have a disruptive effect on parts availability.

Although manufacturers can't prevent the occurrence of these outside events, there is much that they can to do to insulate themselves from the effects through identification of supply chain risks related to supplier locations, transportation risk and overdependence on single sources. Also, at a time when banking and market uncertainties remain high, the importance of checks on financial as well as operational and capacity vulnerabilities can't be underestimated. Then there is the need to identify 'self-inflicted risks', such as a preferred reliance on a single supplier for certain components because managers perhaps feel comfortable with its product or team. This might come at the cost of overlooking vulnerabilities in the supply chain.

Financial market conditions are adding to capacity and ramp-up concerns.

A steep ramp-up

PwC's analysis of announced programme rates shows the extent of additional capacity needed in the period to 2016.



Pinpointing ramp-up risk

Managing risk in the supply chain is all the more important in commercial aerospace where the industry operating model has pushed much of the design and manufacturing work to suppliers, often in the form of risk-sharing partnerships. The ramp-up will place considerable strain on suppliers' capacity and velocity. PwC's analysis of announced programme rates indicates a workload increase equivalent to adding more than 200 additional single-aisle aircraft every year across all growth programmes. Many observers believe suppliers to major aircraft makers have underinvested in new capacity and technology, which could herald capacity constraints in the coming years. There is also recognition of the need to understand potential shortages at the bottom of the supply chain, like specialty raw materials such as titanium and carbon fiber.

When you look more closely at the rate readiness of suppliers, the strains become more visible. We analysed the potential capacity risks in the aerospace supply chain by identifying which suppliers' operations will be most strained by projected rate ramp-ups on key 2011 – 2016 growth programs. We then mapped that against which suppliers may be worst positioned financially to invest in additional capacity. Our study covered 12 key growth programmes from five commercial and defence OEMs[1]. We calculated required capacity growth and financial readiness scores for 93 suppliers across nine different component and system segments. The results showed that a fifth (21%) of suppliers aren't financially ready to support the high ramp-up that is required.

Companies in the aerospace sector are alert to the need to proactively identify, prevent and manage supply chain risk. But our experience with many A&D industry players suggests that current approaches to supply chain risk management are either too complex or too simple. We have seen companies trying to assign an absolute probability percentage to each supply chain risk or apply an undifferentiated and resource-intensive approach of performing a detailed due diligence on each of their suppliers. At the other end of the spectrum, companies sometimes rely on internal or supplier surveys to obtain a qualitative view of supply chain risks.

But both the in-depth and the 'lighter touch' approaches have limitations. Questionnaires can be insufficiently forensic. They also run the danger of bias as they rely on the views of suppliers themselves. Often responses are based on opinions not facts, and they tend to be informed by past experience. More in-depth approaches, though, can be resource intensive and can only cover a certain number of suppliers at any one time. They might, for example, start with the largest suppliers, but the biggest risks may not reside in the biggest suppliers but may be multiple layers down in the supply chain. Both the in-depth and the simpler approaches have the potential of turning 'risk management' into 'issue management', addressing only current supplier issues rather than identifying future dangers.

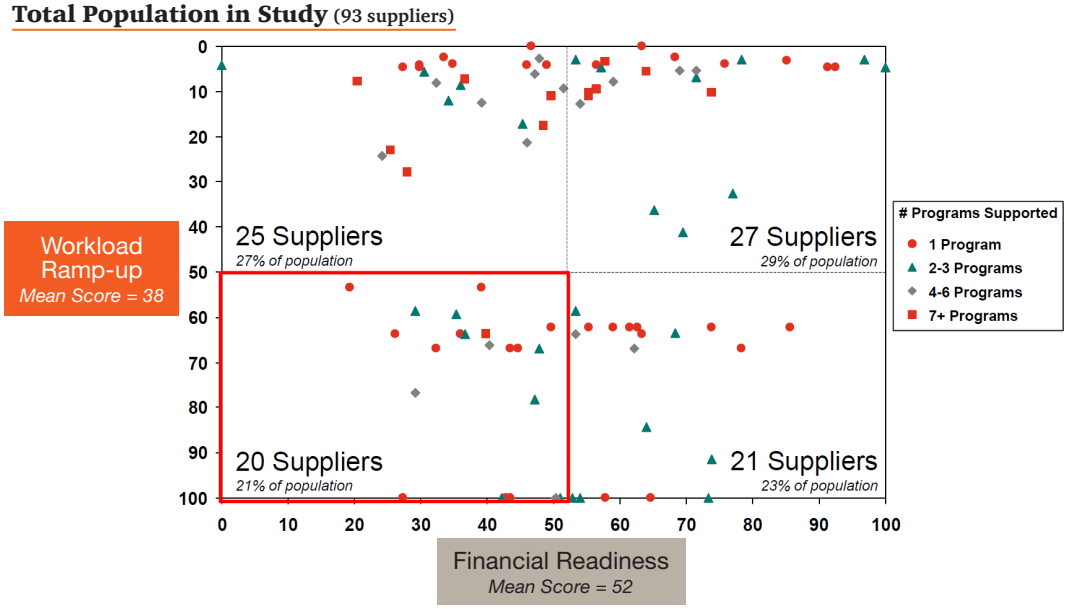
A fifth of suppliers are at risk of not being able to deliver the ramp-up that is required.

1 737, 777, 787, A320, A330, A350, A380, G280, G650, C-Series, C919, F-35.

Companies need a more effective more 'live overview' of where the biggest risks lie.

At risk – ramp-up vs financial readiness

Our analysis of suppliers shows 21% facing high ramp-up but with low financial readiness.



Addressing multi-dimensional risks

PwC has developed a more practical but rigorous approach to assess risk and develop effective mitigation strategies. Our approach starts with a model that can be used to continually monitor and assess risk in the A&D supply chain. It is based on facts, not opinions, and combines readily available public data and information with data that is internal to the client company. Examples of publicly available data include supplier location, certain financial information, and the likely collective production volume of the supplier across different platforms. This is supplemented with internal data such as the supplier's on-time and quality performance. To determine capacity risk we take into account demands on suppliers from all programmes, both commercial and military, including those from competitors.

We combine these elements to form a comprehensive and multidimensional set of measurable risk and impact attributes. Each attribute is measurable to enable relative ranking of composite risk and impact. The attributes can be weighted to reflect their shifting importance to the organisation or changes in the external or industry environment. Each company in the supply chain is included, and the result is a grid-based map of relative risk, enabling the client company to identify where the biggest potential risks lie. It is not overly burdensome or complex and, once established, can be continually updated to provide companies with a more 'live overview' of potential supply chain risk as well as the effects of ongoing efforts to reduce supply chain risk.

Each dot on the grid represents a purchased component (or service). Each tells a particular story. For example, it might be a 'single sourced part used on 70% of finished products delivered by an unstable supplier.' If that is combined with the fact that qualifying another supplier might take six to 12 months, it presents a very practical focus and a compelling case for action to any C-level executive.

Becoming rate ramp-up ready

Using the model to identify potential risks, we then move on to deploy our 'private equity based' methodology to conduct what we call a 'rapid supplier assessment'. Here, there are obvious parallels between what a private equity company needs and the requirements of aircraft OEMs at the top of complex supply chains. Both need to pinpoint where risks lie and what it will take to address them. In discussion with the client company, we prioritise the suppliers that pose the greatest supply chain risk and arrange site visits to their primary manufacturing sites. A small team of highly experienced aerospace and supply chain experts conduct a review of operations, capital plans, equipment, processes and other important business and operational areas. The assessment combines site visits with data analysis and interviews. We also look at the supplier's own supplier management and performance to identify risks two levels down in the supply chain. The approach can be customised to any situation. It can remain broad, concentrating on overall operational and financial risk, or focus more narrowly on issues such as capacity risk.

The aim is to have a highly pragmatic approach, seeking to verify risk and the changes that can be put in place to avoid it. These changes might take the form of alterations in the client company's supply chain management to reduce reliance on the particular supplier, reforms to be carried out by the supplier, or a combination of both. In exceptional cases, it might even take the form of a decision to acquire the supplier and take direct vertical control of that element of the supply chain.

In September 2011, for example, EADS took a majority stake in German company PFW Aerospace which faced a liquidity crisis. In other cases, consolidation within the supply chain might be needed to address capacity constraints and other ramp-up concerns.

Whether or not there is a need for M&A, PwC is experienced in advising companies and delivering the required supplier transformation programme. A 'supplier transformation plan' would be developed at company level describing objectives and yearly targets, capability improvements and performance targets. It would typically include an investment plan integrated into the company business plan with a series of detailed actions. A 'work stream plan' would identify each improvement action per work stream plus critical milestones, objectives, and key performance indicators. Each work stream would also have a detailed 'investment plan'. To get the supplier transformation plan and

The priority is a supplier transformation plan that can quickly address vulnerabilities.

Consolidation within the supply chain or vertical integration cannot be ruled out.

work stream plan into action, we would 'zoom in' on the first 100 days. A '100-day plan' would give a detailed calendar for the kickoff and rollout of each work stream initiative as well as highlight the main communications initiatives.

One of the challenges facing supplier companies is how they adapt to participate effectively within the overall value chain ramp-up. In our experience, many tier-ones still need to upgrade their core capabilities to improve the reliability of their end-to-end performance in the value chain. This includes the maturity to manage their interface with their customers and the joint interface with other tier-ones, particularly the integrated performance of their core capabilities. There remains a tendency to 'firefight' or 'muscle through' to meet the ramp-up challenge. This can come at the expense of ways to really structure, monitor, and dynamically collaborate as part of an extended supply chain.

Conclusion

In summary, the need to rapidly expand production in a number of aerospace platforms is putting strains on the supply chain. Our analysis indicates that a significant proportion of suppliers are at risk of not being able to deliver the ramp-up that is required. Companies need a practical yet comprehensive method to identify rate readiness risks in the A&D supply chain.

We have developed a way for A&D companies to quickly understand and pinpoint risk across the whole supply chain. Then companies can prioritise those suppliers with which it needs to conduct a deeper review and implement changes to reduce particular risks, using parallels with the approaches taken by private equity firms to assess M&A target risks and opportunities. In the majority of cases, supplier transformation to address risks can take place without the need for any M&A. But, in some cases, consolidation either within the supply chain or vertical integration of the supplier with the aircraft manufacturer should not be ruled out.

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