As they grapple with challenges ranging from pressure on costs to scarcity of talent, and from new competitors in emerging economies to a changing industrial footprint, aerospace and defense (A&D) companies are becoming more aware of the need to work in efficient and mature Extended Enterprises. But realizing that goal means resolving tensions between familiar and new ways of working: security versus openness; intellectual property protection against shared innovation; pooling of skills against fierce competition for talent, to name just a few. None of these are irreconcilable. But balancing them effectively to create a high performance Extended Enterprise is a major departure. It needs new thinking and different behaviour.

Greater integration between suppliers, partners and customers is a clear direction of travel for the industry. Our research\(^1\) shows that A&D businesses grasp the necessity of working in an Extended Enterprise in order to address the challenges they face in a fast changing market but are finding it hard to structure their specific objectives within a collaborative context in order to secure a broad range of business and operational benefits (see Figure 1). As they progress with their efforts - at various stages of maturity - they are starting to address the requirements of what it means to operate with true collaboration in a networked organization. But they admit that they are not there yet. Accordingly, this point of view compares our research into the progress A&D businesses have made to date with Accenture’s analysis and recommendations of the fundamental underpinnings of a successful Extended Enterprise and what it takes to achieve high performance.

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\(^1\)To gauge the maturity of their efforts towards operating as an Extended Enterprise, Accenture commissioned a qualitative survey among 12 leading A&D companies. Interviews were conducted by an external agency on behalf of Accenture during the period between 18th February 2013 – 2nd April 2013.
Theory and practice
Greater collaboration has undoubtedly been a characteristic of the A&D industry in recent years. However, our research and market insight highlights that the majority of relationships still tend to be hierarchical, consisting largely of stronger partnerships with preferred suppliers. Smaller organizations are far less integrated across the overall production process and tend to be governed by traditional contractual relationships. This more pyramidal structure observed in the industry today contrasts with Accenture’s view of the Extended Enterprise as a comprehensive network of firms (including customers, suppliers and other third parties) who directly or indirectly collaborate in the design, development, production, delivery and support of a product (see Figure 2). The Extended Enterprise includes all means of collaboration (people, process and technology) required to manage efficiently the interdependencies of the network.

“We must understand that there needs to be transparency throughout the value chain, that we need to share.”
Head of Procurement, France

“I want very strict control over the information that these individuals may leak to the outside.”
Head of Planning Management and Procurement, UK

Figure 2. Extended Enterprise: a comprehensive network, using all means of collaboration
The Extended Enterprise framework – key streams

In building the extended network, Accenture has identified five key streams of activity, or building blocks, that companies will need to consider (see Figure 3).

Many businesses will focus on one or two of these building blocks in isolation. But creating a successful Extended Enterprise rests on integration of all five building blocks and an understanding of the interdependencies between them.

We set out to understand where companies see themselves today and the challenges and barriers they perceive in moving towards operating within a collaborative ecosystem of partners. In response, we use the research findings and our experience in the market to offer our view of the steps those A&D businesses may need to consider to overcome these obstacles as they pick up the pace towards achieving successful Extended Enterprise models.

Figure 3. Five fundamental elements of the Extended Enterprise

**Collaboration & Governance**

Working together to achieve a common goal, with mutual understanding of needs and objectives. Developing partnerships or contractual relationships, depending on the closeness of collaboration.

**Agile Operations**

The ability to flex and adapt to changing needs across the Extended Enterprise. Defined in terms of agility in new or existing relationships, as well as adapting to changes across the ecosystem which impact on processes or product delivery.

**Talent & Competencies**

Developing and sharing the skills and competencies needed across the Extended Enterprise for mutual benefits, whilst managing and retaining the best talents for competitive advantage.

**Innovation**

The ability to capture and integrate innovations across suppliers and technology partners, creating barriers to competition while remaining in control of company’s intellectual property.

**Data Sensitivity & Regulations**

Ability to execute business in compliance with aviation authorities rules, legal & contractual requirements, and governmental requirements and to demonstrate at any point in time the conformity of the whole EE to those requirements.
In the context of Extended Enterprises, how companies define and organize the governance to achieve their shared goals underpins the success of collaboration. It is the fundamental building block of the whole model. The effectiveness of an Extended Enterprise rests on a foundation of trust. Trust, in turn, requires transparency. In a highly competitive industry that is not always easy to achieve. But any omissions, or allowances, made in the information provided between partners will ripple throughout the entire ecosystem, with the likely result that the model will not work. A common vision of objectives, the role of each party involved, decision-making processes, common framework, IT Governance and security rules are critical (see Figure 4). If all partners, for example, build in an unstated contingency for their own delivery schedules then there is little chance that an overall program will deliver on time. Avoiding that calls for a profound shift in culture. A true Extended Enterprise is an interdependent network of organizations in which no single player has the ultimate operational control. Governance must encompass all the parties involved, from multiple suppliers to clients. These need to operate as a single virtual entity while still maintaining their independence. Each relies – albeit to a greater or lesser extent – on the others and the information they provide. And that is why trust is fundamental for success.

Our research underpins the gap between theory and practice in achieving pervasive collaboration. Acknowledgement of the importance of collaboration, with shared objectives and a common organization has not yet been met with the practical steps and the development of broader relationships to achieve it. Businesses are encountering a number of barriers. There are concerns about the appropriate level of collaboration and the definition of roles required. Defining the right performance indicators and developing common standards and compliance with regulation and certification are also frequently mentioned, as are the challenges of working with contacts that balance risk and rewards between parties. Confidentiality and data security are also of particular importance, creating a tension between the demands of openness and transparency on the one hand and the need to protect proprietary IP and data on the other.

Collaboration therefore still tends to be configured vertically which leads to the creation of silos that, in turn, lead to inefficiency, rather than within a more diffuse, networked ecosystem. But many businesses have already identified the steps and actions that they will need to take to drive greater collaboration. These include common metrics, tools and methodologies – and above all the mechanisms to help achieve transparency of communication and information that will drive trust. The next stage is to turn theory into practice.

That means achieving a balance between the constraints of controlling information that must be protected at the same time as delivering the openness among the wide range of partners that will help realize an ecosystem that revolves around a nucleus of trust. That will, in turn, require real-time visibility of performance, enabled by technology that can integrate all parties into common and interoperable systems for exchange and monitoring.

**Figure 4. Maintaining the circle of trust**

- Defined roles and level of involvement within EE
- Formal and informal consultative bodies
- Consistent performance indicators, tools and processes
- Defined IT Governance
- Common framework, tools and processes
- Set a common vision and management of skills and competencies
- Defined and monitored security rules
- Type of collaborative model and organization
- Coordination mechanisms and decision making processes
- Defined level of agility by stakeholder
- Collaboration & Governance
What does agility mean in the context of the Extended Enterprise? In part it’s the necessary speed of reaction enabled by effective collaboration to changes taking place. That could mean, among other things, new relationships, new customer requirements and/or changes in strategic orientation as a result of a new product. It means being able to react to unexpected and disruptive developments: to changes in product specifications, to switching suppliers quickly, to responding to a change in regulation and so on.

Our research shows that awareness of the need for agility to respond to developments in the business context through changes and improvements to business processes is not yet matched by the ability to harness collaboration in order to make those required changes at pace (see Figure 5). A&D businesses cite the fact that as theirs is a heavily regulated industry, rapid change is inherently challenging. The complexity of processes also means that businesses experience a lag between the decision to make a change and their ability to implement.

Yet the premium A&D companies place on agility is justified. Being able to respond rapidly, decisively and effectively will become more and more important as market conditions and the A&D operating environment is subject to unpredictable, pervasive and rapid change. Achieving agility across a network in an Extended Enterprise will therefore require the development of a shared referential for processes that are agreed and understood by all parties and supported by IT that can drive successful business transformation. That means agreeing in advance the processes that should be used (for example choosing between the prime contractor’s or sub-contractor’s) to make the overall organization more effective and the final product more efficient as well as the extent to which all or only part of a process should be used to achieve the desired results. Continuous adaptation to change for any business is not possible – to operate efficiently and effectively the Extended Enterprise needs a stable set of processes that are agreed and understood by all parties prior to activities starting. IT has a critical role to play as a buffer to absorb subsequent changes, providing a collaborative platform using standard interfaces to maximize interoperability within the network – and developments in technology mean that this long-promised ability is now at a sufficient stage of maturity to deliver (see Figure 6).
“We have to have a certain agility. Otherwise we could not survive.”

Head of Procurement, UK

“It’s about being agile enough to implement...in a short period of time, and having the track record for doing that.”

CIO, UK
“We’ll go in with our team, look at their processes, improve them and then split the difference in the benefits 50-50.”

Head of ICT, UK

“For a lot of other stuff they are competitors...all of them want to avoid others getting too much knowledge in a neighbouring area, which may be accessible if you exchange people.”

Head of Service and Support, Germany
3. Skills and talent management: breaking the Extended Enterprise silo

Operating with agility demands having the right people, skills and talent to effect changes quickly wherever they are needed. There is a widespread industry recognition that required talent is in very short supply. It’s well established that an ageing workforce has been a problem for some time. This is further complicated by the fact that operating in a highly regulated industry imposes restrictions on the extent to which talent can be simply imported from elsewhere. Maintaining IP and assets – specifically as relates to defense – places restrictions on the talent strategies that could be deployed in a more open market. Talent’s scarcity drives ever more intense competition. And it raises a particular challenge for the talent pool available to small and medium-sized enterprises that are essential to an Extended Enterprise operating effectively. For businesses to be responsive and able to take risks, they need to have the right people to operate in that way. So developing local talent in the ecosystem becomes increasingly important. The question is: how can all businesses meet those demands?

There is, inevitably, a balance to be met between the immediate talent needs of each individual organization and the broader strategies to create a sustainable ecosystem. Building talent across the Extended Enterprise is critical. That will require, for example, sponsoring and investing in relevant university faculties, sharing resources across the enterprise and exchange between suppliers and customers to drive collaboration and trust. In turn, that depends on adopting a holistic view that takes into account the requirements of the entire network, not simply the short interests of the largest players.

The evidence from our research shows that companies are indeed exchanging talent and skills. However, the more strategic approaches tend to be restricted to larger suppliers and integrators who are sharing talent more willingly, particularly to address complex work. There is elsewhere a significant tension between the need to retain competitive advantage and the requirement to add skills in order to drive innovation and adapt to changing customer requirements. It is a tough balance to achieve. So while A&D businesses recognize that exchange of personnel can deliver major benefits – among them lower costs and increased profitability for both parties – they are also wary of undermining their sources of competitive advantage in what is a hotly contested talent market.

In Accenture’s view, the development of an Extended Enterprise rests on the ability to share skills, expertise and knowledge throughout the ecosystem. Sharing has to happen to the benefit of the entire network, rather than in isolated parts. Accordingly, we see four key activities as essential to achieving that goal:

- Tactical planning
- Product-centric resource planning
- Local investment
- Developing networks of research/university alliances.

Trust notwithstanding, these may need to be governed with suitable non-disclosure agreements (NDAs) and no-poaching agreements (see Figure 7).

Figure 7. Four streams for skills and talent management in the Extended Enterprise
"I need to share, I need to bring that innovation inside my company. But innovation is the basis of being profitable, being competitive."

Head of Planning and Procurement, Italy
4. Innovation: diversity of thinking for greater market differentiation

Working in a truly collaborative mode usually means avoiding reliance on a single supplier and will involve extending a collaborative platform to multiple businesses. However, as those suppliers are also competitors, they rely on the protection of the fundamental IP that underpins their competitive advantage. Sharing therefore must have its limits. And that is a difficult balance to maintain. Certain data must be kept secure to protect competitiveness. So, to optimize the Extended Enterprise, managing the tension between openness and competition is essential.

And that of course, is critical to the whole area of innovation. The more the customers rely on the Extended Enterprise to contribute to their value chain – not simply as suppliers but as true partners – the more those partners will take ownership and accountability for specific pieces of work. This is a decisive shift from simply the request for a component to the delivery of a complete function to achieve a specific objective and drive competitive advantage. The question of who ‘owns’ the innovation that arises from that process again raises challenges for collaboration and sharing and the appropriate governance models that need to be in place.

Our research confirms that A&D companies see increased innovation as one of the key outcomes of working in a truly collaborative Extended Enterprise. The ability to take advantage of multiple sources of knowledge to develop and refine products distributed throughout a network, and of more efficient and cost effective development, are both major attractions leading to increased market differentiation. But these undoubted benefits are matched by hesitancy about protecting IP and the potential for misalignment of business goals between partners. In addition, our market analysis shows that even where businesses clearly understand the value of collaborative innovation, their wariness of losing IP and its related benefits means they tend to limit activity to early phases of product development.

But as the game shifts from having the best engineering, to harvesting innovation in the network, it demands an approach to ensure that the entire network can remain innovative. Securing continuous innovation within the Extended Enterprise arises from making sure that the whole network is optimized rather than focusing on local improvements or short-term advantage. For instance, driving down suppliers’ prices will yield short-term benefits. But the negative impact of those same suppliers failing will cause greater and longer lasting damage. It will restrict the supply of specialist capabilities and retard innovation. To avoid that fate, recognition of mutual dependency is key, and calls for a joint approach to innovation. That means sharing risk and reward across partnerships, with portfolios designed to achieve common goals and shared innovation roadmaps. However, this collaborative innovation must be supported by clear NDA and IP management and enabled by strong technological constraints to increase protection (see Figure 8).

Figure 8. Key success factors for Extended Enterprise innovation

<table>
<thead>
<tr>
<th>Innovation Partnerships</th>
<th>Joint steering and funding</th>
<th>Supplier support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promote research and innovation through partnerships, focusing on research and innovation within the EE.</td>
<td>Jointly manage, steer and fund innovation portfolios to reach common goals.</td>
<td>Support suppliers across the Extended Enterprise to define product innovation roadmap.</td>
</tr>
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NDA & IP management, supported by IT constraints
5. Data sensitivity and regulatory compliance

As the complexities of balancing talent with the need to retain competitiveness demonstrate, sharing data and information – essential to collaboration – in the A&D context is far from straightforward. The heavily regulated nature of the industry demands strict adherence to the highest levels of data security and regulatory compliance. Those constraints are widely recognized by the industry and fall into three main issues:

- Product safety – the fundamental building block of reputation in the industry.
- Secure product technology – critical for competitive advantage
- Control of the supply chain – working globally is connected with the ability to achieve and demonstrate regulatory compliance (see Figure 9).

In Accenture’s view, operating effectively as a highly collaborative Extended Enterprise but with robust data security and regulatory compliance is possible – but achieving it needs a new approach with a commitment to joint certification to ensure regulatory compliance:

- A joint certification plan including all levels of the supply chain must be set-up prior to starting to work on a product. Prime contractors should neither:
  - assume full responsibility for the product’s certification; nor,
  - push the certification issues down below their Tier 1 responsibilities – it has to be defined and agreed jointly.

While today we see responsibility for compliance and data security cascaded down from larger to smaller suppliers, an Extended Enterprise requires a more holistic solution. And that can be provided through an effective approach to product lifecycle management (see Figure 10). This offers a complete set of processes, capabilities and best practices across all roles and organizations. It provides the means to support end-to-end traceability and data integrity across the entire product lifecycle, enabling collaboration at the same time as placing necessary limits for data confidentiality across roles and organizations as required. Effectively protecting IP is especially important for established A&D players in the face of increasing competition from new market entrants.

“Our ability to work globally and protect that IP and ITAR material is critical to our staying in business.”

Head of Engineering, US

Figure 9. Constraints affecting the compliant Extended Enterprise
Figure 10. Product Lifecycle Management

- Configuration Management Discrepancies, concessions and data management
- Product delivery optimization
- Production costs control
- Traceability
- Data Integrity
- Control on the product structure all along the lifecycle
- Data Reliability
- Enhanced control on suppliers work packages progress
There is a clear realization in the industry of the direction in which everyone needs to travel to secure a profitable future. What will that entail? There will have to be some degree of margin sacrifice. Building trust is a long-term process, depending on a whole range of intangible factors. Conversely, it can be destroyed very quickly.

All respondents to our research agree that achieving an efficient Extended Enterprise organization is critical to addressing the many challenges of globalization. However, getting implementation of the Extended Enterprise wrong can have significantly adverse affects on companies’ performance (operational and financial) and their resilience. Businesses therefore must be able to define the optimal level of Extended Enterprise for their organization to maximize the chances of its successful implementation. In our view a high performance Extended Enterprise should be articulated around five key streams of activity, each with different implications, but all linked together to build a best-in-class enterprise organization in A&D (see Figure 11).

The rewards from creating an effective Extended Enterprise are becoming increasingly apparent. While it is by no means the panacea for all the challenges facing the A&D industry, it is a major component in responding effectively to the new and emerging demands of the global market. The time to act is now.

**Figure 11. Bringing it all together**

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**Collaboration & Governance**
- One vision
- Include all parties
- Networked organization
- Defined roles and rules.

**Agile Operations**
- Shared processes
- Compliant with rules & regulations
- Common IS/IT tools and processes.

**Talent & Competencies**
- Skills and capabilities managed within the EE ecosystem – shared pool of talent, training, etc.
- EE as a competitive advantage.

**Innovation**
- EE is the innovation enabler and strong fertilizer. If well managed this should facilitate:
  - Alignment of technology roadmaps
  - Joint steering of innovation portfolio
  - Shared IP and innovation funding.

**Data Sensitivity & Regulations**
- Common certification plan
- PLM in the heart of overall product development process and tools.
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