

23rd Annual Global CEO Survey | Trend report

Defence trends 2020: Investing in a digital future

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Defence trends 2020

Technology has dramatically disrupted the defence industry. This is true not only of the platforms and systems increasingly in demand by armed forces but also the internal processes that defence firms use to get those products and services to market.

Western countries are trying to dramatically accelerate their procurement models to get promising technologies into the field faster, often adapting applications from the commercial world such as 5G. Emerging cyber, electromagnetic and biowarfare threats are adding to the urgency and changing the nature of defence, as well.

Technology, procurement and workforce trends shape the sector

Although defence spending worldwide remains strong, the issue shadowing nearly every industry as we write is COVID-19. The full economic impact of this global health emergency is not yet known, but defence firms should monitor potential disruptions to their supply chains and ensure cooperation and engagement among territories.

Despite these headwinds, Western countries are investing to upgrade major defence platforms, including ships, submarines, tactical aircraft and nuclear capabilities, after two decades of asymmetric warfare in the Middle East. That recapitalisation effort has driven a steady rise in defence spending and a growing demand for newer platforms that incorporate AI and other tools to turn data into a tactical advantage.

In the US, the fiscal 2020 budget includes US\$738bn for defence spending, a US\$20bn increase over the previous year, including funding for the space force and US\$146bn on a long list of military hardware.¹

Australia's Ministry of Defence has dramatically increased spending on ships, submarines and other platforms. Countries such as India and South Korea increased defence spending in 2019 by roughly 8%,² and European defence spending in 2019 is estimated to have grown by 5% over 2018.³ Many Middle East Gulf states are also investing heavily to upgrade their forces.

Yet changing attitudes in alliances are altering the customer mix. For example, the Trump Administration has pushed NATO member countries to comply with their agreed-upon defence spending threshold of 2% of GDP, leading to a significant uptick in investment.⁴ Similarly, other pressures on traditional alliances have led some countries to begin building up their own capabilities in key areas.





For example, the formal withdrawal by the US from the Intermediate-Range Nuclear Forces Treaty has already led some countries to begin investing in strategic weapons systems and national level C4ISR (command, control, communications, computers, intelligence, surveillance and reconnaissance) on their own.

Elsewhere, several Western countries and partnerships are investing heavily to develop sixth-generation fighter jets, including the US's Next Generation Air Dominance platform and the UK's Tempest airframe, developed in conjunction with Italy and Sweden.⁵ Germany and France are collaborating on the Future Combat Air System (FCAS) fighter, with Airbus and Dassault Aviation.⁶ (It should be noted, however, that there may not be capacity or funding for three different sixth-generation fighter programmes.)

For defence contractors, the spending increase should be cause for celebration, but a sense of uncertainty pervades. New competition, increased digitisation and accelerated procurement timelines will continue to weigh on incumbent players. To succeed in uncertain times, leadership teams must plot strategy to anticipate changes, rather than reacting to them.

The challenge comes down to understanding which current changes are small blips and which are large-scale shifts that require an organisational response.

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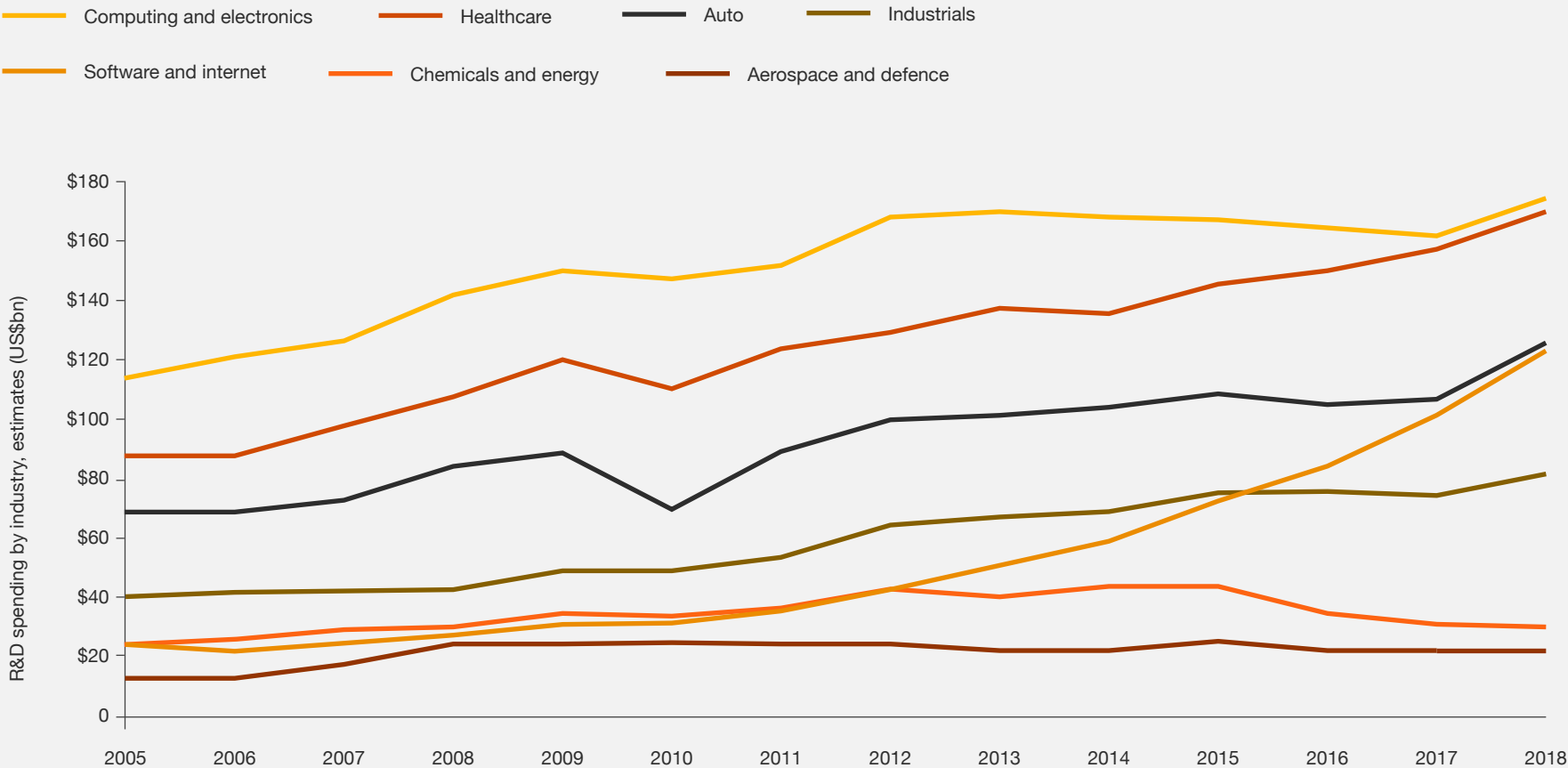
Focusing on large-scale shifts, we see three current shifts underway that will radically alter the defence industry. The first and most important is the need for digital transformation. Thus far, many defence companies have taken steps to incorporate technology in their products and services, but they lag behind other industries in their R&D investments in critical areas such as AI and automation. This will also include investment in areas such as hypersonics, advanced materials, autonomous technologies and space.

The second major trend involves procurement. New technologies arrive far faster than they did in the traditional acquisition cycle and increasingly they come from new market entrants. And in the US, in particular, procurement now also emphasises acquiring innovative technologies with shorter life cycles than the typical large platforms, from both traditional defence suppliers as well as smaller technology players, and often a combination of the two.

A key underlying factor is that the industry is currently being outspent on R&D. The 2018 [Global Innovation 1000](#) study — the annual analysis by Strategy&, PwC’s strategy consulting group, of the 1,000 publicly held companies that spend the most on R&D — found that aerospace and defence companies typically spend less on R&D as a percentage of revenue than both software and other tech companies, a finding that held for every year of the study (see exhibit). Amazon spends more on R&D than the entire global aerospace and defence industry.

Exhibit

A&D companies’ R&D spending has been largely flat in recent years



Source: PwC Strategy&, “What the Top Innovators Get Right,” *strategy+business*, 30 Oct. 2018



The third trend is a need for changes in the defence contracting workforce, which was the subject of a 2019 Workforce Aviation Study jointly sponsored by PwC and Aviation Week Network and supported by the Aerospace Industries Association and the American Institute of Aeronautics and Astronautics. The study found that the current workforce profile, with many older workers nearing retirement, represents a chance to dramatically reshape the workforce through large hiring waves.⁷



A strategic response to disruption

For incumbent defence contractors, the new normal of persistent disruption calls for a strategic response, at several levels. Digital technology is reshaping the nature of combat and the nature of business, and defence companies need to transform nearly every aspect of how they operate in order to compete. Companies need to relentlessly embed new technologies into their products and services, and into the ways that they bring new products to the market.

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But even as they do so, defence companies need to identify and prioritise the technologies and capabilities that align to their overall business strategy and R&D plan. In addition, companies need to engage the entire enterprise in these efforts, from products and services to production facilities to back-office functions.

Adding to the disruptive environment, waves of innovation and technology coming from commercial firms have upended what had been a relatively stable sector.

Leading technologies are no longer proprietary to defence, and in some cases they're no longer classified. Governments are now far more willing to look at commercial technology, to work with nontraditional contractors, and to acquire products and services in new ways. Space is a good example, with multiple players competing to offer services to government procurers. Amazon Web Services' ongoing dispute⁸ over the JEDI contract for cloud-based services for the Pentagon, which had been awarded to Microsoft in October 2019, is another.

Despite such developments, many incumbent contractors have deeply embedded cultures and ways of working. They are accustomed to a traditional model in which Department of Defense (DoD) sets requirements and they develop products to meet those requirements. That approach worked for decades, but it is no longer enough. Today, contractors need to anticipate disruption and, ideally, disrupt themselves through new applications and technologies. They must develop strong scenario-planning functions that allow them to project ahead to new kinds of problems and challenges that armed forces will face in the future.

A call to action

For management teams, the challenge of operating in a time of uncertainty is determining how to respond. We believe that several priorities should be at the top of the leadership agenda right now.



Transform to capitalise on digital

Developing or enhancing products and services with digital technologies — explicitly tied to the company's strategy — may require the biggest investment. It also may take time to generate a return on investment (ROI), at least an operating cycle. To accelerate learning, management can establish partnerships with commercial players, Silicon Valley, academia or other entities.

Leaders will also need to determine the right structure to share ideas, potentially through joint ventures, partnerships or outright acquisitions, and stay abreast of changes in acquisition models, such as shifts from traditional procurement to X as a Service (XaaS).

Internally, companies should use digital to change how they work, accelerating R&D, development and manufacturing processes in order to lower costs and get rapidly evolving technologies into the field faster. Digitising the factory or service delivery, commonly referred to as the Fourth Industrial Revolution (4IR), involves embedded sensors and analytics that can dramatically improve the efficiency of manufacturing processes, generating an ROI in the short to medium term.

Contractors can also incorporate digital into their internal processes, used to develop and manufacture new platforms and systems. For example, the traditional approach to developing a new fighter, with prototypes and iterative testing and redesign, is being replaced by model-based systems engineering, which uses advanced simulations that can run many of the early-stage tests through digital simulations. As a result, the first physical product is much closer to the end result.

This approach is significantly faster than traditional development, allowing more innovative technologies to get into the field faster, and it is less expensive as well. Boeing and Saab developed the T-7 Red Hawk trainer using such an approach, and virtually all defence contractors are moving in this direction.⁹



In the back office, companies can drive significant cost savings and enhanced decision-making ability by digitising all support functions. The back office can benefit from new technologies such as cloud computing, data analytics and data visualisation technologies. The overall objective is to automate transaction processing and create enhanced business insights for better decision making. Many of these investments will have an immediate to short-term return on ROI.

For example, using digital tools to transform the finance function and optimise procurement spending can generate a significant cost savings.

Other applications of emerging technologies include using virtual reality to better train workers, to help retain some of the institutional expertise of long-tenured employees who are approaching retirement age, and to improve maintenance and repair processes.

The Naval Group in France has already put some of these applications in place. For example, a technician can now pull up a simulation of a complex job in advance and send a live feed of that job back to a centralised facility to get additional support remotely. In addition, some companies are using ‘digital twins,’ simulations of manufacturing plants and supply-chain components to model the impact of a proposed change in advance, before making any changes to physical assets.



Capitalise on changes in procurement

A key edge that many commercial firms have is an agile culture, allowing them to get new ideas to market faster. That is a marked contrast with the culture at many incumbent defence firms, refined over years to traditional waterfall processes and extremely long lead times. A recent publication by PwC's Global Defence Advisory Board, about the challenges that governments face in building a future-ready defence force, addressed the need for faster procurement. "When a platform is scoped 30 years before its delivery, changing course mid-development is a unique problem.... [A] reduction in procurement times would facilitate the ability to respond more quickly and efficiently to the changing demands in fighting war over time."

Incumbent firms can forge partnerships with commercial companies and other entities — including academia — to ensure they have access to the latest cutting-edge technologies (and are aware of newer technologies coming over the horizon). For many years, defence technology spawned commercial applications; today, the flow of disruptive new ideas moves in the opposite direction.

Companies need to ensure they actively scan the commercial landscape for technological innovation. Boeing's HorizonX initiative, which invests in early-stage companies with promising technologies, is a good example.

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More broadly, companies can revamp their processes to develop new platforms and systems with an emphasis on speed and agility, in order to fend off new competition. In the US, the Next Generation Air Dominance programme, for example, aims to field a new fighter by 2025, much faster than previous-generation planes. To achieve that, the programme involves an open-source discussion among multiple competitors to develop new technologies and get them into use faster.¹⁰

Notably, the Next Gen programme will also consist of smaller, shorter-cycle purchases, with modular systems and avionics packages that can be rapidly swapped or replaced to outfit planes for specific missions, or to more easily upgrade their capabilities over time. In France, an initiative known as digital design, manufacturing and services (DDMS) is using a similar approach to speed product development at Airbus and Dassault.

As the PwC Global Defence Advisory Board put it, "In designing future forces, planners and decision makers should seriously consider abandoning their overreliance on major platforms. This means scrutinising any plan justified by a new-for-old replacement policy... Instead of replacing equipment with a new model, planners should assess the use case for the technology first." (Notably, some question whether the investment among Western countries in a next-generation fighter is warranted, given that other countries are investing heavily in hypersonic missiles capable of achieving the same outcomes as a fighter and at lower cost.)





Upskill the workforce and create a digital culture

In both 2018 and 2019, aerospace and defence companies hired far more people than they originally expected. (Over the longer term, the smart use of technology and digital manufacturing processes will likely lead to a smaller workforce overall.)

But to meet the growing need for digital capabilities, defence contractors must rethink their approach to talent. They need to change their employee-value proposition to make themselves more attractive to recent engineering and computer-science graduates (in some cases cultivating relationships with students before they even graduate).

In the Aviation Week Network's "2019 Workforce Study," 63% of respondents cited a lack of skilled teams as a key obstacle to digital innovation.¹¹ The last major transition in the defence workforce was a shift from traditional engineers in aeronautics and mechanical engineering to people with expertise in electronics and software. The next generation of engineers will migrate to digital skills, including artificial intelligence and data analytics.

Not coincidentally, those kinds of STEM-related skills, particularly in AI, are increasingly in demand among virtually all industries — especially technology and financial services, which can be more attractive to some young workers (and often pay more). The competition for talent continues to grow.

As part of this imperative, firms will need to create a digital culture, with agile, collaborative approaches to project delivery. This entails more uncertainty than engineering processes of the past — which have tended to be very structured and standardised, with clear gates and phases — and it represents a significant departure for large incumbent defence firms. And in addition to creating this message, they need to spread the word during recruiting processes, with a compelling message to potential hires about the significance of the work that they do.

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For current members of the workforce, companies need a structured approach to talent development, to ensure that workers have the skills they need to execute a digital transformation. Some firms are using a critical-skills approach to identify a subset of must-have capabilities, then benchmarking their people against those skills and developing training programmes to close the gaps. In PwC's 22nd Annual Global CEO Survey, nearly half of respondents said that significant upskilling was the most important factor in closing the skills gap, but one year on, only 18% reported significant progress in establishing upskilling programmes.¹² To be effective, upskilling initiatives should be both internal (including mentorships, digital learning modules and job rotations) and external, such as partnering with academic institutions, particularly in STEM-related disciplines.

Finally, defence contractors need to continue diversifying their workforce. Diversity is a key objective of most organisations in most industries, and for good reason — employees with different backgrounds bring a wider range of perspectives to a given problem. Moreover, changing demographics mean that organisations that don't actively increase diversity and inclusion throughout the workforce are limiting their potential talent pool. Calls for diversity in the defence industry are not new, yet the industry needs to redouble its efforts in this area.

To improve, companies can create affinity groups for specific demographic categories of employees, which can boost inclusion and increase retention. Some organisations have hired a chief diversity officer to coordinate efforts across the organisation. Defence companies should also be visible in the industry, by participating in — or even sponsoring — outreach events, conferences, career fairs and similar activities. One major A&D company hosts a recurring Women's Conference, where speakers discuss ways that the organisation has increased the number of women in its workforce.





Conclusion

The defence industry faces significant uncertainty in 2020, but there is also significant opportunity for those that take action:

- Invest in digital to accelerate R&D, development and manufacturing, and to automate transaction processing and generate business insights
- Consider partnerships with commercial players, Silicon Valley, academia or other entities to build and integrate innovative technology capabilities
- Develop new platforms and systems to increase speed and agility, and actively scan the commercial landscape for technological innovation that could support a tech-enabled strategy (which will be critical to maintaining competitive advantage)
- Transform workforce strategy to attract, upskill and retain diverse talent with the requisite digital skills, including artificial intelligence and data analytics

By seizing the initiative and investing in digital throughout the value chain — along with diversifying and upskilling its workforce — defence firms can ensure that they are operating at the speed needed for success.

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Authors and contacts

Australia

Terry Weber

Partner, PwC Australia
+61 2 6271 3522
terry.weber@pwc.com

France

Matthieu Lemasson

Partner, PwC France
+33 1 56 57 71 29
matthieu.lemasson@pwc.com

Germany

Jan Wille

Partner, PwC Germany
+49 4063781989
jan.h.wille@pwc.com

Middle East

Susanna Mason

Partner, PwC Middle East
+971 2 694 2983
susanna.mason@pwc.com

United Kingdom

Craig Kerr

Partner, PwC UK
+44 20 7804 9477
craig.w.kerr@pwc.com

Diane Shaw

Partner, PwC UK
+44 07 8256 76420
diane.shaw@pwc.com

Roland Sonnenberg

Partner, PwC UK
+44 20 7804 5162
roland.sonnenberg@pwc.com

United States

Glenn Brady

Partner, PwC US
+1 314 206 8118
glenn.brady@pwc.com

Anil Khurana

Principal, PwC US
+1 734 773 8902
anil.x.khurana@pwc.com

John Niehaus

Managing Director, PwC US
+1 415 498 6886
john.niehaus@pwc.com

Miguel Smart

Principal, PwC US
+1 703 283 7737
miguel.smart@pwc.com

Scott Thompson

Partner, PwC US
+1 413 441 2702
scott.thompson@pwc.com

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