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Is the Digital Revolution in Aerospace and Defense in Crisis?

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May 2018

AT A GLANCE

Survey results on digital adoption in the aerospace and defense (A&D) industry point to an industry-wide imperative: realize the value of digital investments faster—or reconsider those investments.

Are Higher Investments Paying Off?

Investments in digital technology are growing—and so are concerns about the returns. Industry executives say that their most important digital challenge is how to demonstrate value. Although A&D companies excel at defining a digital vision, they lag behind automotive and industrial manufacturers in terms of establishing digital enablers, such as talent, data and analytics, data infrastructure, and digital ecosystems.

Enablers Unlock Value

To maximize value from digital, A&D companies must increase their investment in digital enablers. For each type of enabler, companies should identify the investment areas that offer the most valuable support to their business strategy.

The digital revolution in aerospace and defense (A&D) has reached an inflection point. As A&D companies accelerate their investments in digital technologies, their leaders are questioning whether these investments are paying off. In many cases, they are not getting satisfactory answers.

Some A&D companies may respond by pulling back on their technology investments, while others may double down. The results of a recent BCG study indicate that a third approach is a more effective way to unlock value: companies should complement their direct investments in digital applications with simultaneous supporting investments in digital enablers, such as talent, data and analytics, data infrastructure, and digital ecosystems.

The study draws on our second annual global survey of senior A&D executives and managers. (See the sidebar "About Our Survey.") The survey results revealed the following:

- A&D companies continue to prioritize investments in digital technologies. For many, digital is at the top of the CEO's agenda. Investment levels are increasing to support both core operations and new growth areas.
- Rising investments are accompanied by heightened concern about returns. Respondents cited demonstrating value as their most important digital challenge, a finding validated in our discussions with company leaders.
- In comparisons with automotive and industrial manufacturers, A&D companies stand out for defining a digital vision but lag behind in terms of investments in digital enablers.

Taken together, these findings indicate that enablers should be the key focus for A&D companies as they seek to maintain the momentum of their digital revolution.

Companies should complement their direct investments in digital applications with simultaneous supporting investments in digital enablers.

Digital Investments Are Accelerating

A&D, like other industries, is being reshaped by nine digital technologies. (See Exhibit 1.) A&D companies place a high priority on investments in these technologies. More than half (54%) of respondents to our survey indicated that in 2018, their company plans to invest more in digital technology than it did in 2017. And nearly one in four (23%) said that their company plans to invest more than $100 million in

ABOUT OUR SURVEY

In March 2018, BCG conducted its second annual survey of digital adoption in A&D. Participants included 204 executives from A&D companies around the world. These companies span the value chain from low-tier suppliers to prime contractors. The goals of the survey were to evaluate the extent of companies' progress over the past year in implementing digital, to benchmark the industry's digital maturity against that of comparable industries, and to identify the factors that contribute to success. In addition, the survey covered investment levels, the technologies implemented, the results attributable to digital, the challenges companies are facing, and the key enablers deployed.

We used select dimensions of BCG's Digital Acceleration Index (DAI) to gauge the digital maturity of the A&D industry and benchmark it against that of other industries. (See "Beyond the Hype: The Real Champions of Building the Digital Future," BCG article, July 2017.) The DAI questionnaire evaluates dimensions in four building blocks of digital adoption: business strategy, digitizing core operations, new digital growth, and enablers. (Our survey focused on one element of business strategy: digital vision.) Responses to the questionnaire help determine which of the four stages of digital maturity (passive, literate, performer, or leader) a company has achieved for each of the dimensions.

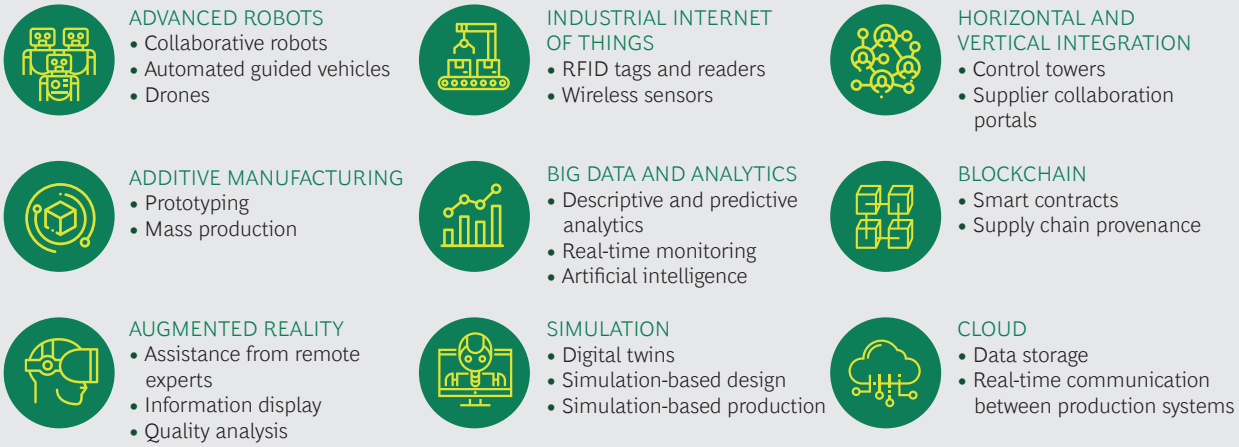
We compared the average digital maturity of the A&D companies surveyed with that of automotive manufacturers (the digital leaders in the manufacturing sector) and industrial manufacturers (a closely related industry) in the DAI database.

digital initiatives in 2018. Survey respondents said that their highest investment priorities are in 3D printing for prototyping, data storage in the cloud, simulation-based design, and big data and analytics.

Digitized core operations (R&D, manufacturing, supply chain, procurement, program management, sales, and services) are table stakes for competing in the industry. In this year's survey, 96% of respondents, compared with 91% in 2017, said that they plan to increase investments to digitize core operations. Their objectives in making these investments include the following:

- Promoting higher efficiency in R&D and accelerating time to market for new products
- Improving the efficiency, affordability, and resilience of their operations
- Raising support function productivity
- Gaining a better understanding of customers and their needs and improving the accuracy of user profiles

EXHIBIT 1 | Nine Digital Technologies Are Reshaping A&D Operations



Source: BCG analysis.
Note: RFID = radio-frequency Identification.

A&D companies are also increasing investments aimed at tapping into new sources of growth. The share of respondents who said that their company plans to increase investments in new growth areas rose from 52% in 2017 to 65% in 2018. Companies seek to increase revenues by introducing new products or services, as well as by creating new business models—for example, selling imaging data from a network of satellites rather than selling satellites to customers that want to collect data.

The most innovative A&D companies are developing applications for digitizing core operations and then commercializing these tools and selling them to other companies. One leading manufacturer developed a tracking system for monitoring the flow of parts through the value chain. By using the system, which works with a variety of identification tags, the company has saved more than $100 million annually. After several years of successful implementation, it now sells this tracking system to other companies, driving top-line growth. Another leading manufacturer developed an application that uses augmented reality to automate quality checks, reducing both the time required to perform checks and the number of errors. The manufacturer sells the application to companies in its supply chain, thereby improving the quality of components used in its aircraft.

Demonstrating Value Is the Top Concern

Survey respondents said that demonstrating value from digital investments is their most important digital challenge. Cultural concerns, the top challenge in the 2017 survey, fell to second place.

The concern about demonstrating value was also apparent in our discussions with company executives. “Show me the money” is a common refrain voiced by CEOs who want either to understand whether past investments in digital capabilities have generated returns or to evaluate the business case for new investments. Many of the executives reported that they have struggled to demonstrate value.

Ahead on Vision but Trailing in Other Dimensions

The findings of our study's cross-industry comparison of digital maturity offer insight into why A&D companies are finding it difficult to generate value from their large investments. The comparison reveals that A&D companies are ahead of automotive and industrial manufacturers with respect to digital vision—assigning high priority to digital and setting a clear strategy. However, in terms of digitizing core operations, pursuing new growth areas, and, especially, establishing enablers, A&D companies trail these industries. (See Exhibit 2.)

Automotive and industrial manufacturers are investing more in enablers than A&D companies and generating more value as a result. To maximize value from digital, A&D must follow the lead of these industries and align the maturity of their enablers with that of their digital vision.

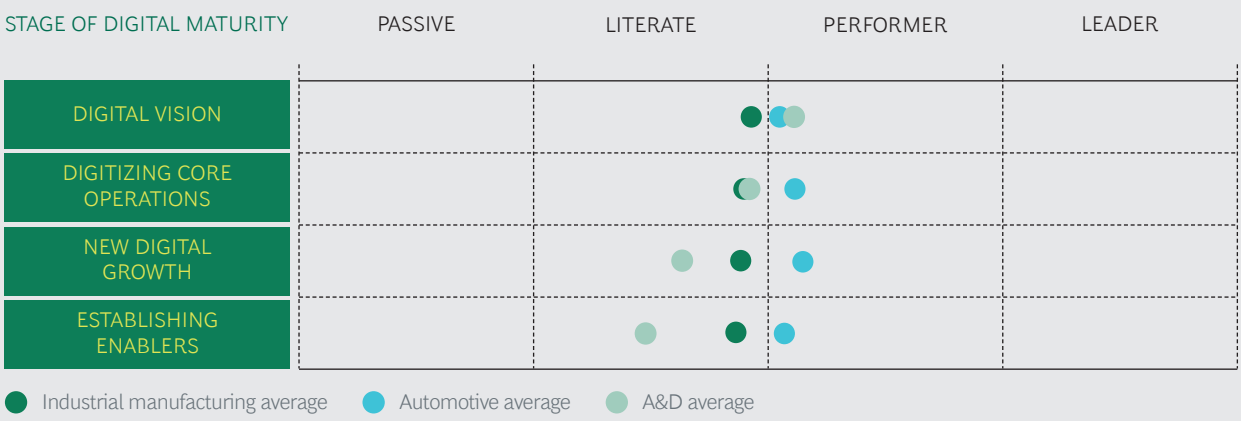
Invest in Enablers to Unlock Value

A&D companies need to revisit their approach to critical enablers in a number of categories. In each category, companies should identify the areas for investment that are most valuable for supporting their business strategy. They should strengthen their capabilities in the following categories:

Talent. Leading companies augment the digital talent in their organization both by "upskilling" current personnel and by hiring new employees. They also create new digital roles, such as chief digital officer (CDO), and establish retention models for digital talent.

Leadership and Culture. To foster cultural change, companies embed digital talent and tools throughout the organization, its governance structures, and decision-making bodies. For example, companies have established reverse-mentoring programs, through which young digital experts help older leaders understand

Exhibit 2 | A&D Is Strong on Vision but Lags on Enablers



Sources: BCG digital adoption in the A&D survey; BCG Digital Acceleration Index (DAI) database.
Note: Results are based on 15 of 37 dimensions of the DAI.

digital trends. Companies have also designed digital academies that provide training on digital topics to employees from all levels of the organization. In addition, they have empowered digital organizations to foster change and make investments. Many companies now have the CDO report directly to the CEO.

Agile at Scale. To accelerate value creation from digital, companies deploy agile principles at scale throughout the organization. These principles, which emphasize rapid iterations and cross-functional collaboration, help break down silos and achieve better outcomes faster. They can be applied in developing software or hardware. For example, a manufacturer that recently used agile at scale to accelerate the development of a new helicopter was able to reduce time to market by more than 65% and costs by more than 50%.

Data Strategy. Leading companies regard data as a critical asset for creating value. They use analytics, artificial intelligence, and machine learning to make decisions and drive new business models. They regularly measure data's contribution to value creation. They also establish data lakes across the enterprise.

Leading companies regard data as a critical asset for creating value, and they regularly measure data's contribution to value creation.

Data Infrastructure. Companies that excel in digital adoption deploy a fully flexible and scalable IT architecture that leverages the cloud and digital architecture. Because these companies gain the ability to scale their data infrastructure up or down as needed, they can reduce their data center operating costs and reinvest the savings in other digital initiatives.

Digital Ecosystem. For many technologies, large, mature ecosystems of suppliers and partners have evolved to support innovation and adoption. Leading companies take full advantage of this broad set of potential suppliers and partners, establishing partnerships and experimenting with complementary value-adding offerings. For example, one leading A&D manufacturer has partnered with a top data services provider to create an open-data platform that enables airlines to enhance fleet reliability through predictive maintenance. This unique offering is gaining traction among customers.

As the focus of digital adoption evolves from experimenting with new technologies to powering the business, company leaders are demanding results: their huge investments in digital must generate tangible value. But even if companies lack clear demonstrations of value, we believe it would be a mistake to pull back. Instead, to scale initiatives and create value, A&D companies must increase their investments in enablers. Indeed, the enablers are essential for converting a digital vision and early successes into sustained value. Although the ROI on these enablers is achieved over a longer term than that of the digital investments they support, A&D companies that fail to put them in place will continue to find that demonstrating value from digital is an elusive goal.

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Acknowledgments

The authors are grateful to David Klein for writing assistance. They thank Katherine Andrews, Gary Callahan, Elyse Friedman, Kim Friedman, Abby Garland, Sean Hourihan, and Shannon Nardi for editorial, design, and production support.

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