

Data as jet fuel: An interview with Boeing's CIO

It isn't always comfortable, but data analytics is helping Boeing reach new heights.

Boeing CIO Ted Colbert is something of an evangelist for the power of data analytics. He recently spoke with McKinsey's Aamer Baig about how he has been spreading the word within Boeing, and why even companies overflowing with analytical talent sometimes have to work hard to reap its full rewards.

The Quarterly: *Does a company like Boeing, renowned for its engineering prowess, have a head start when it comes to harnessing the power of digital analytics?*

Ted Colbert: To some extent, yes. We have a company full of engineers, mathematicians, scientists, and statisticians who achieve amazing things. And data analytics is certainly not a new field to the company. When I first started to raise its growing importance, we probably had about 800 people we could classify as data scientists, which was a great start. But when we started to ask how data driven our decisions were, whether we really used the insights we had to drive productivity and the capabilities of the company, we quickly discovered there was much more we could be doing.

For example, we'd been using data-science capabilities to improve maintenance decisions for a decade. But we hadn't been pulling data from

the factory floor to understand how well Boeing's production system was working. Take the 787. I visited our factory in Everett [Washington] at a time when we were under pressure to improve productivity. I wanted to better understand how the mechanics worked. I was told, quite reasonably, that they followed processes that are documented in a procedures manual, and everything anyone did was logged in a system, as required for certification. We took a more concerted effort to find improvements for factory-floor disruption, such as mechanics spending a quarter of their time identifying parts, plans, and tools to start their jobs.

At first, many people told me there was nothing new in what I was saying about data analytics. "We already do that," was the common response. It's only when you can produce these kind of proof points in areas that matter that the light comes on for people—when they are under pressure to drive margins, for example, but realize that the playbook they've been using for years just doesn't deliver anymore. It changes the mind-set. People come to understand that there is a ton of richness trapped below all the capability that already exists in the company.

Getting to that understanding isn't always a comfortable journey. For example, we wove together about 13 systems to show how much inventory was sitting in our systems that didn't have a demand pull. In a company our size, you might expect it to be worth tens of millions of dollars. But we found it added up to hundreds of millions of dollars. That made a few people very uneasy, and their first instinct was to dispute the data. Let's face it, when you highlight this kind of stuff, you are highlighting the need for cultural change. But Boeing is a 100-year-old company, and I don't see my role as one of simply reinforcing how great it is. Rather, it's to figure out where truth lies in data that will help us flourish for the next 100 years.

The Quarterly: *How do you move from demonstrating data analytics' power in a handful of projects, to embedding it across a company the size of Boeing?*

Ted Colbert: Demand for data-analytics resources mushrooms as you demonstrate its value. At one time, we had over 100 data-analytics projects in the queue related to improving productivity, be it in design, engineering, manufacturing, or product support. But you have to be very strategic and deliberate about how to scale up. On the one hand, you have to build momentum with a portfolio of projects—some small, some medium-size, and a few in bigger, important areas. At the same time, you have to think long term. The portfolio might yield tens of millions of dollars here, and maybe a couple hundred million there—and you still could be only scratching the

surface. Analytics will take billions off the bottom line if you figure out how people across the entire organization can grasp the opportunity—and how to democratize the capability.

That can be tricky, because what you don't want is people trying to go create their own data platforms all over the place. It's that fragmentation that went wrong in the IT world 20 years ago and that makes it so hard today to get at data. So you need to keep working on projects that prove the power of data analytics and at the same time, in the background, plan the foundational architecture and work toward a common platform. That platform will eventually allow you to stratify data-analytics work. You can still put the most expensive, smartest data scientists on the biggest problems, but you have unleashed the power of the platform to one and all.

The Quarterly: *A high-performing digital culture is one that is agile, that can move quickly to embrace technological developments, all the while testing new ideas and products and services, and learning in the process. How do you square that with the way of working at a company like Boeing, whose products take decades to develop?*

Ted Colbert: It's a fundamental issue. Boeing's DNA is built around a long business cycle and one that puts safety first. So whether you are developing airplanes, fighter jets, or satellites, progress can be barely perceptible, like a giant cog rotating. Digital developments, on the other hand, are tiny cogs, moving 100 times faster. My job is to make sure both function together—that the smaller cogs don't break the big one. Often that means isolating our “fail fast” activities.



Ted Colbert is the CIO of Boeing and senior vice president of Information Technology & Data Analytics. Before joining Boeing, in 2009, Colbert served as senior vice president of Enterprise Architecture at Citigroup.

Boeing's services business is essentially a digital business, and it's often a better place to learn than our commercial and defense businesses. If we give our engineers and other people an opportunity to work there, it will help move the culture forward. Ultimately you *can* introduce agile ways of working and speed up processes even for products that are as complex and important as ours—and the result will be a better product. But it helps to begin with things that are far away from that big cog and work our way toward it over time.

There is another level of complication for us, too. At Boeing, we start designing new products decades in advance. We don't continuously roll out new ones that can be tweaked with our latest know-how. Let's say we're looking ahead to a new plane we're likely to build in two or three decades' time. The engineers would want to know, today, the efficiency-enhancing tools that would be available in order to build their business case for the plane. I can't just say, "Trust me, we'll be using machine learning in the design process." No one can sign up to big productivity gains if there is any doubt they will materialize. It would destroy the whole cost and sales model.

We can't completely solve this. It comes back to proof points. So we are setting up a series of what we call pathfinders that will demonstrate data analytics' worth. These bring data-analytic capabilities and agile ways of working to bear on mature production programs such as the 737, where we need to raise the rate of production, and the 787, where there's an opportunity for additional margin expansion. This is the only way we are going to get buy-in to future programs.

The Quarterly: *Has Boeing's hiring culture changed? Traditionally, Boeing's senior managers have been internal promotions—people who have been with the company throughout their careers. Is that model still tenable?*

Ted Colbert: What keeps me awake at night is whether we have the right talent. On one of our projects, I simply couldn't find someone on the business side who understood all the end-to-end processes well enough to deliver. So you absolutely have to build the skills of the people who know Boeing well, who have so much expertise. And if you want them to work differently, you also have to build credibility with them. Many have been around for 20 or 30 years. That can be hard for people like myself from outside the industry—I came via the car industry and banking. We do the usual things like trips

to Silicon Valley to demonstrate different working environments. But fundamentally, the only way to change minds is to prove that there's value in doing things differently.

The Quarterly: *What would success look like for you in a couple of years?*

Ted Colbert: Reaching escape velocity! By that I mean that I don't want to find myself pushing as hard as I've been pushing the last couple years for changing the way we work. If that were the case, gravity would still be pulling us back toward the status quo. I want to be a catalyst for change. I want to have established the foundational capabilities that will help senior business leaders harness the power of digital analytics to better deliver on their objectives. Then I can step back and watch take-off. 

Ted Colbert is the CIO of Boeing. This interview was conducted by **Aamer Baig**, a senior partner in McKinsey's Chicago office.

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