Deloitte.

THE RIPPLE EFFECT

Stories of purpose and lasting impact

From product to production system (and beyond)

Simulations and scenario planning help rocket scientists make one giant leap

WHAT'S IT TAKE TO **SHIFT FROM MAKING PROTOTYPES** TO **FULL-SCALE MANUFACTURING?**

THE SITUATION

The space industry is experiencing a renaissance, with new players, new products, and entirely new business models. One launch services provider in particular has spent years developing and testing its flagship product—critical rocket hardware for commercial use—and practically perfected it. Then it found itself at an inflection point.

A backlog of customer demand was steadily growing, meaning the company would need to change its trajectory—and soon. Meeting demand would mean increasing production volume from tens of units at a time to hundreds—and, eventually, thousands. Leaders had dialed in the product; now they needed a production *system*.

Practically speaking, that meant retooling a prototype factory into a high-volume production line. And while this happens every day in manufacturing, commercial space is a uniquely new industry, with all the business risk and complexity of a new venture compounded by the profoundly risky and complex nature of the products themselves. There are no precedents and just a handful of pioneers creating new ways to discover new territory. Complete (white) space.

So, would company leaders need to invest in new facilities, or could they scale within their existing footprint? What would capital investment look like for either scenario? Company planners had set aside significant capital for the effort; was it the right figure? How many people would they need? What would it take to win?

For help assessing their options, they called Deloitte's Supply Chain & Network Operations practice, global specialists in manufacturing strategy and operations.

THE SOLVE

Of particular interest: Deloitte's ability to blend the practicalities of running a manufacturing plant with the tools and creativity needed to uncover unseen possibilities. Certainly: Build and bulletproof processes. Work through talent constraints. Make the most out of existing equipment and tooling. But also: How much volume *could* a factory support? What might limit things—in terms of material, people, equipment, or floor space?

But first things first: *data*. The company provided baseline operational information—rocket science, actually—things like part designs; materials, tools, space, and people requirements for those parts; geometries and recipes and how much time each process step takes. With these in hand, the Deloitte folks headed for the shop floor to talk shop with the engineers. Time to get into the weeds. *Everything* was questioned.

Okay, do you really have to do this step before this step? Why does that step take as long as it does? Could you do it faster if you moved it over there? Does it need this much space? Could you work these things simultaneously?

This data was fed into a series of aerospace manufacturing analytics and simulations—algorithms refined by Deloitte practitioners over years of learning, experience, and leading practices—to create and run a digital model of the company's production system under various scenarios. Could you do it faster if you moved it over there? What happened when output doubled? Quintupled? Increased by 10x, 50x?

This kind of modeling helps leaders zero in on the least capital-intensive way to scale manufacturing, backed by sometimes surprising insights. (Production bottlenecks, drivers, and other variables don't always show up where expected. Still, it's better to keep the surprises digital, when possible, with scenarios thought through before filling out a single capital request form).

The conclusion? The company could dramatically increase throughput—over 20x their previous production rate—at less than 10% of the originally budgeted cost. In fact, the biggest challenge wouldn't be budget or materials or equipment; it would be culture. It would be people. Because to produce at scale, company engineers would need to shift, in the words of one Deloitte practitioner, "from artists to infantrymen"—an entirely different mindset. Prevailing thinking from the floor, for instance, was that more machinery might be needed, when, in fact, existing machines were running well under capacity and could do the necessary work if run faster, continuously, with detailed schedules and added shifts of operators.

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THE IMPACT

All entirely addressable. Company leaders were, to put it mildly, pleasantly surprised with the option of *not* writing a check—cash that could be invested elsewhere in the business and give the company a longer runway for its offerings (pun unintended, but unavoidable).

They were similarly pleased with the speed at which they could ramp their production, speed that would hasten scaling the business and reaching their strategic goals.

Meanwhile, Operations leaders came to understand and appreciate the cultural shifts needed to transition from prototypes to scaled manufacturing, from products to production. The Deloitte team's diligence in walking the shop floor paired with their transparency in how that data informed modeling and recommendations (in other words, *showing their work*) helped make the case.

This newly informed perspective led to a new mission for manufacturing, with sky-high ambitions for growth. (Though in this case, the sky is no limit).

LET'S CONNECT.

Do these challenges sound familiar?

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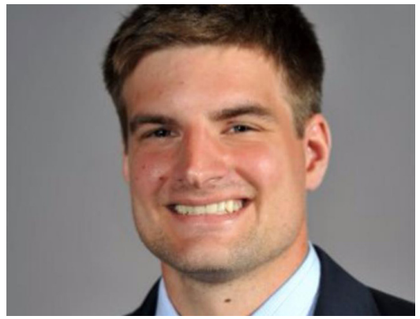

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