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A Custom Belt In Under 60 Minutes: Are Manufacturers Capable Of Keeping Promises?



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On a recent trip to India, I realized that I had landed in the country sans a belt. My brother-in-law whipped out his phone, pulled up an app and ordered a belt. I was surprised to receive it in under an hour!

If I had, instead, ordered the desirable Rolex Cosmograph Daytona (with a [near-decade waiting list](#)) and it had arrived in the hour, I would have been worried that it was a fake.

It is the 'somewhere in between' that enrages consumers.

In general, though, the expected order-to-delivery time for goods, especially the more complex manufactured goods, falls somewhere in between. Consumers are willing to wait patiently, often for extended periods, for that futuristic electric vehicle

they've dreamt of for so long.

But they also want certainty. They want to know when the kitchen equipment, furniture or car charger will arrive so their home is move-in ready. And when they don't get an accurate delivery date, they write scathing complaints with titles like "Wait times = hopelessness"—a real title I found on Reddit regarding an electric vehicle delivery date.

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Business buyers aren't thrilled either.

Businesses also face similar challenges. They need everything from chips (of the silicon kind) to oxygen tanks to be delivered in a timely manner.

Whether private or commercial, customers agree that "somewhere in between" is the last thing they want to hear when placing an order. And this is nothing new. For over a decade, [supply chain executives have known](#) that "the number one challenge in maintaining customer satisfaction" is accurately promising delivery dates.

Are manufacturers capable of making (more) accurate promises?

Most manufacturers use near-term production plans or finished product inventories to predict finished goods availability. This "available to promise" (ATP) data is generated using statistical black box models that calculate possible delivery dates based on past history. Unfortunately, history is unreliable for forecasting future performance, and the predicted delivery dates are often inaccurate or need a wide "somewhere in between" range to be correct.

ATP predictions worsen when the good has to be fabricated because it is now missing one additional and critical component: available production capacity.

Even if you have all the necessary parts—and this is a big "if" given the current geopolitical, ecological and logistical disruptions—you still need to make sure that your factory has the necessary available workforce, equipment and time to build the finished goods. This broader ability to either pull from what is available or make and deliver on the fly is called "capable to promise."

Capable to promise (CTP) takes ATP, overlays production capacity, runs a more complex calculation and generates a much more accurate delivery date. Simply, $CTP = ATP + \text{production capacity}$.

Challenges In Implementing CTP

If CTP is superior to and more inclusive than ATP for calculating the delivery date, why don't more manufacturers use it? Because maintaining an accurate, real-time model of the production capacity is challenging.

To calculate production capacity, you need to pull the following in real time:

- Existing and forecasted orders and inventory.
- Bills of material (BOMs).
- Routings.
- Business rules.

The above needs to be pulled from the enterprise resource planning, manufacturing execution system and inventory management systems. Then you have to put all that data through a robust planning and scheduling process to publish a customer-facing date.

This process is often technical, complex and overwhelming because many manufacturers manage this data in Excel. It takes a production team many hours to perform a single capacity calculation manually.

The resulting CTP estimate is often far from optimal. But that doesn't matter if the customer waiting at the order screen for a delivery date has left long before it could be calculated.

Many manufacturers have implemented production planning systems to automate these calculations, but these earlier-generation systems don't go into the belly of the manufacturing beast. The approximations used compromise the quality of the plan and promise.

Four Functionalities That Help Enable Real-Time CTP

Calculating production capacity quickly, accurately and autonomously can be more effective if the manufacturing systems have a few particular capabilities.

First, an integration framework that can **automatically pull error-free production data** into one environment is important. Second, consider a constraint-based modeler to configure all of the constraints (including production assets, routings, manufacturing rules and prior CTP commitments) and accurately define the entire problem.

Then, a local searchable solver that utilizes the fully defined production model and explores as many solutions as possible to find **the most optimal one** increases efficiency. Finally, consider a fast algorithm for responding to changes in the real world, empowering the solver to complete the production capacity calculation in real time and generate the most accurate delivery date in seconds.

Implementing CTP Functionality

There are at least three ways to make CTP real. The first is to accept that the existing technology stack, lacking all four requirements, cannot calculate an accurate CTP. Then, assuming it has several of the requirements, apply an AI algorithm to fill in (some of) the gaps to better estimate the production capacity. The estimated CTP will ideally be more accurate than the ATP-only delivery date and make a difference to the business.

The second is to build a custom CTP-capable solution in-house capable of all four requirements. Doing so requires sophisticated in-house software and math skills that the manufacturer will need to assess. Since it is custom code, the assessment will also need to factor in maintenance costs due to constantly changing business and manufacturing requirements.

The third approach is to install a commercial, purpose-built APS system that natively incorporates all four CTP enablement functions. While this requires integration into the existing technology stack, the solution is often dynamic and highly responsive, less risky, and financially sustainable as development and maintenance costs are distributed.

Keeping The Promise With CTP

The importance of CTP to improve delivery estimates cannot be overstated. Not every company is capable of delivering a belt in under 60 minutes, but the ability to make and keep real-world commitments can allow manufacturers to differentiate themselves and win the consumer's confidence and business.

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