

The Analytics Supply Chain

Thomas H. Davenport and Zahir Balaporia

Businesses across many industries spend millions of dollars employing advanced analytics to manage and improve their supply chains. Businesses look to analytics to help with sourcing raw materials more efficiently, improving manufacturing productivity, optimizing inventory, minimizing distribution cost, and other related objectives.

But the results can be less than satisfactory. It often takes too long to source the data, build the models and deliver the analytics based solutions to the multitude of decision makers in an organization. Sometimes key steps in the process are omitted completely. In other words, the solution for improving the supply chain i.e. advanced analytics, suffers from the same problems that it aims to solve. Therefore, reducing inefficiencies in the *analytics supply chain* should be a critical component of **any** analytics initiative in order to generate better outcomes. Because one of us (Zahir) spent twenty years optimizing supply chains with analytics at transportation companies, the concept was naturally appealing.

More broadly speaking, the concept of the analytics supply chain is certainly applicable outside of its namesake business domain. It is agnostic to business and analytic domains. Advanced analytics for marketing offers, credit decisions, pricing decisions, or a multitude of other areas, could benefit from thinking about deploying advanced analytics using the supply chain metaphor.

Steps in the Analytics Supply Chain

Analytics can easily be viewed in supply chain terms. In the analytics supply chain, the customers are decision makers and the products being consumed are analytical models. The analytics engines that serve up recommendations or solutions are akin to manufacturing, turning data into consumable decisions. Data are the raw materials that enable us to generate the analytical models. The outputs of this supply chain are better decisions—ideally embedded into business processes and systems so that they can be performed repeatedly.

Let's take this one step further, starting with data. We all know what happens to physical supply chains when we don't have the right raw materials, especially of the right quality. When your data has low quality, so does your analytics – and, ultimately, the decisions you make. Beyond intrinsic quality, reliable access to raw materials is equally important. As product supply chains stretch across the oceans, data supply chains stretch across multiple systems and firewalls. Integration of such data can be time-consuming and expensive, and interruptions in the data supply chain can be very disruptive to decision making. And if decisions are sensitive to more real-time updates, then having data delivered with low latency is just as important as a key component arriving on time at the loading dock.

As we've mentioned, analytical models have much in common with manufacturing processes. These models are the machines that transform data into consumable predictions, recommendations and insights. The quality of those predictions, recommendations and insights relies on the same attributes as the quality of finished manufactured products. They must be fit for use, offered at a cost that attracts consumers, and made available when the consumer wants or needs them.

Analytics supply chains that take too long, or are too expensive to deliver the solutions that decision consumers need, get replaced with solutions that are more readily available. These solutions are often end-runs around the enterprise-level analytical infrastructure. These alternatives might range from “gut feel” to a spreadsheet. The spreadsheet is low cost, and the quality seems fit for use because the higher quality solution isn’t available, will take too long, or is too expensive. What many users of spreadsheets don’t realize is that they are prone to errors—between 20 and 80% of spreadsheets have been found to have errors in several research studies. And they lead to proliferation of different versions of the truth around an organization.

Finally, an analytics-driven decision is the finished product in the analytics supply chain, so let’s think about deployment of analytical solutions like product distribution. Just as products sitting in warehouses don’t deliver bottom-line results, models sitting on an operations researcher or data scientist’s computer that can’t be deployed efficiently will not deliver value to your decision making. For example, the Netflix Prize engendered a model that improved the ability to predict user ratings films by over 10%, but it was never implemented because it was too complex. And as the number of models grows due to technologies such as machine learning, the ability to manage the growing inventory and distribution of models to support decision making will become more important in managing your analytics supply chain. Hiring more advanced analytics professionals would help, but that labor supply chain has its own limitations and should be viewed as an important constraint in designing an analytics supply chain.

Benefits of the Supply Chain Perspective

The primary benefit of considering analytics as a supply chain is a change in an organization’s perspectives and processes for doing analytics. It means that an organization can take a broad, holistic perspective on the use of analytics, and won’t develop “local optimum” capabilities that don’t benefit the entire process. We’ve seen companies, for example, that hired super-smart data scientists who can “manufacture” many complex analytical models at a rapid rate. However, because of varied types of barriers (policy/technology/data/scalability/complexity), the company was unable to deploy those models.

Just as supply chain-focused companies measure the performance of their supply chains, those with an analytics supply chain perspective can measure the performance of their broad analytical processes. They can measure inputs (number of models created, number of analysts) as well as outputs (decisions affected by analytics, business value achieved from those decisions). They can rapidly identify bottlenecks and areas of under- and over-capacity. They can measure and improve the “time to insight, decision, and action” of the analytics supply chain for particular problems and decisions.

A large manufacturing company, for example, was in the process of deploying a distribution planning and optimization system. The prototype model was complete and the IT plan to deploy the system was estimated at 10 months and 4 FTEs. By leveraging a new analytics modeling and deployment platform, they were able to cut the deployment time and resource need by 50%, effectively a 75% savings from the original estimated cost. Using this deployment capability has given this company a competitive edge in its analytics supply chain by cutting “time to decision” significantly.

Just as companies apply information technology to optimize and automate their supply chains, technology can also benefit the analytical supply chain. Machine learning, for example, is primarily a

means of automating the production of analytical models. It can be a substantial aid to an analytical supply chain if the organization employing it is able to deploy the resulting models and embed them into business and decision processes. Companies that employ “model management” technology have realized that keeping track of the assets in the analytical supply chain is just as important as tracking inventory in the physical supply chain.

Is Your Analytics Supply Chain Broken?

How do you know if you have an analytics supply chain problem? The following points should serve as a simple initial diagnostic checklist.

- If your ability to deploy advanced analytics is stifled because you need IT, data, and/or other scarce technical resources to respond to changes in your business environment, then you probably have an analytics supply chain problem.
- If the time it takes to modify, calibrate or maintain advanced analytics systems is cutting deeper and deeper into your time to develop and deploy the next set of models, then you have an issue with the back end of the analytics supply chain.
- And if you work in advanced analytics and have been preaching about optimizing everyone’s processes but your own, then it is time to focus on your analytics supply chain.

Moving the word “analytics” forward in the phrase “supply chain analytics” may seem trivial. But a small shift in the location of a word can make a big difference on where you focus your attention.

Zahir Balaporia is a Solutions Partner on the FICO Optimization team. Prior to joining FICO, he spent 20+ years designing and deploying analytics solutions in supply chain, transportation and logistics with a focus on deployment and change management. He can be reached at ZahirBalaporia@fico.com.