Perspective: The Use of Advanced Analytics in Manufacturing Supply Chain Execution and Emerging Use Cases

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IN THIS PERSPECTIVE

This IDC Manufacturing Insights Perspective explores advanced analytics in manufacturing supply chain execution and identifies several of the more interesting use cases. IDC Manufacturing Insights believes that advanced analytics is increasingly being used as a lever to drive value in supply chain execution for manufacturing firms and as such is now a vital component of supply chain execution strategy.

In today's digitally connected supply chain, data is created on a constant basis relative to the end-to-end value chain. We have experienced a dramatic increase in connectivity across the value chain, which shows no signs of slowing down and is, in fact, accelerating at a rapid pace. As the volume of data created continues to increase, it is imperative that manufacturing firms seek to identify opportunity to leverage analytics to drive value for their business.

At IDC Manufacturing Insights, we have discussed at length how we believe that there is more change happening in the manufacturing supply chain than we have ever seen. Much of this change is driven by the state of today's technology, which is the leading force behind the digital transformation movement. Keep in mind that digital transformation transcends the manufacturer; customers and suppliers of the manufacturer are increasingly digitally connected to their own vendors and their own customers as well, driving opportunities for end-to-end value chain alignment. In all, we are experiencing a fundamental transition in how we communicate and interact across the business environment. This transition is pushing the levels of data available well beyond the current capacity of organizations to conduct analytics (see Figure 1).

FIGURE 1

The Analytics Gap
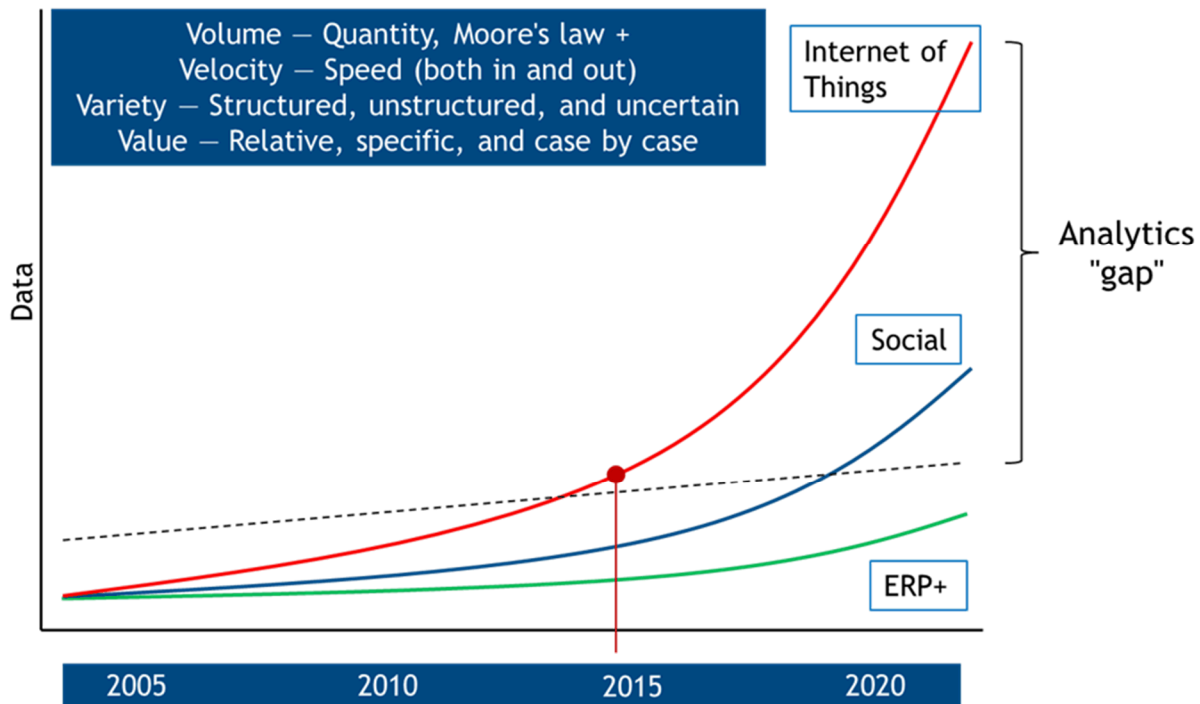
Source: IDC Manufacturing Insights, 2016

Across all aspects of the manufacturing supply chain, advanced analytics has the potential to drastically improve what a business knows about itself, its customers, its suppliers, and the market in general. However, as we continue to see an explosion of information relative to manufacturing supply chains, we must also highlight that the potential to leverage advanced analytics is currently lagging in comparison with the volume of data that is available to draw actionable insight from. Manufacturers that are able to capture data across the value chain and then leverage this information to make informed decisions will be better equipped to grow and prosper in today's environment and to grow and compete in the future.

Use Case 1: In-Transit Asset Visibility in Consumer Packaged Goods

Accurate delivery times for assets in transit has long been a challenge for firms in terms of efficiently managing scheduling at distribution centers (DCs). Assets in motion tend to encounter tremendous variability throughout the distribution network while in transit, rendering delivery schedules no more than a rough guide. This variability results in the inefficient use of people and resources at distribution centers and warehouses. A large consumer packaged goods (CPG) firm identified this as a challenge and engaged Savi, a purpose-built IoT analytics application on the cloud, to help drive visibility of assets in motion and tie this visibility to scheduling and execution within the distribution center. The CPG firm was relying on driver estimates for delivery schedules and required employees to manually update shipment status. As many distribution facilities encounter, visibility was limited to delivery date, and estimated time of arrival (ETA) was often inaccurate, resulting in waste and inefficiency.

To address this challenge, Savi worked with the CPG client's existing telematics and sensor data – no customization was required – and applied Savi's proprietary ETA algorithms to historical and real-time data to enable the CPG client to more accurately predict asset-in-motion arrival times. The advanced algorithms, and built-in machine learning, enable the solution to improve itself as more data is captured through the use of the application, leading to continuous improvement. Through the use of the Savi application, the CPG client has been able to achieve tremendous productivity improvements such as:

- Improved estimated time of arrival of deliveries to the DC by 10 times, enabling greater productivity of personnel in the DC
- Reduced time spent managing in-transit products by 83% by consolidating six systems into a single cloud-based application
- Achieved real-time visibility into goods in transit, eliminating "black holes" typically associated with milestone-based visibility

Real-time visibility across the supply chain has long been a sought after, yet rarely achieved, objective for manufacturing organizations. Through the use of sensor data and advanced analytics, Savi has enabled this CPG client to achieve real-time visibility into assets in motion and optimize planning and execution as a result of true insight into historical and real-time data relative to the movement of goods. This application has helped the CPG client to drastically improve the ETA of shipments, reduce transit times on highly traveled lanes between the factory and the DC, and improve the cross-docking process.

Use Case 2: Segmentation-Driven Inventory Management in Medical Device Manufacturing

A key lever to driving manufacturing supply chain execution improvement is inventory management. Inventory is often one of the largest contributors to cost within a manufacturing organization, and as such, effective inventory management can separate top-performing organizations from the rest of their competitors. A large manufacturer of medical devices identified an issue with inventory management and engaged Tata Consultancy Services (TCS) to help identify the root cause and define and implement a solution to its inventory management challenges. The first step in the approach was to conduct a deep data analytics effort to better understand demand patterns across product and geography combinations. As many manufacturers experience, the demands for product and geography combinations each presented a different demand pattern, yet through analytics, TCS was able to create a segmentation strategy that helped the medical device-manufacturing client create groups of product and geography combinations that had similar demand patterns.

TCS was then able to create demand forecasting strategies that standardized the demand planning and forecasting process based on an optimized approach for each segment. The next step in the approach was to drive the demand planning strategy upstream in the organization to create inventory management strategy based on the optimized demand forecast. By leveraging advanced analytics to optimize the demand planning and forecasting approach through segmentation, the medical device-manufacturing client was able to drive demand planning and inventory management benefits such as:

- Dramatically reduced forecast error
- Increased inventory turns
- Increased productivity out of the demand planning team
- Improved customer service levels

The data leveraged in this effort existed within the medical device-manufacturing client's systems, yet the value achieved was a result of looking at the data in a different way. Through advanced analytics, TCS was able to help the client identify the opportunity, define an optimized approach, and continuously monitor and control segment performance.

Use Case 3: Streamlined Global Trade in Sensor Manufacturing and Distribution

Business today is conducted on a global scale, with suppliers, customers, and facilities located across the world. However, operating on a global scale continues to increase in complexity as firms must work to control cost, ensure regulatory compliance, and manage cross-border logistics. For many manufacturing firms, competing in a global market involves time-consuming and manual processes for gaining insight and making decisions around sourcing and logistics in a complex global value chain. A leading manufacturer of sensors and sensor solutions for industrial applications turned to SAP Global Trade Services application as a solution to leverage analytics as a means to managing its global trade needs.

The sensor-manufacturing client was looking for a solution to enable trade preference calculations across all of its business areas and help manage all global transactions with customs using a single application. During the course of global commerce, a tremendous amount of data is created and captured relative to procurement, sales, shipping, customs, regulations, and more. While much of this information resides locally within the firm's systems, there are elements that are more fluid and often reside outside of the organization's systems (such as country-level regulations). Leveraging SAP Global Trade Services, the sensor-manufacturing client was able to better manage the complexities of global trade with a single system for managing international transactions.

Analytics plays a significant role in the space, as it helps firms make decisions leveraging accurate information, which helps address the risk associated with international commerce. Through increased visibility and enhanced insights, the sensor-manufacturing client achieved benefits such as:

- 15% cost savings (which it was able to pass on to its customers)
- 30% increase in the speed of trade calculations
- Elimination of duplicate data entry through automated data management
- Increased accuracy in documentation

Advanced analytics becomes increasingly important as firms compete on a global scale. Firms must be equipped with insights capable of helping them reduce costs, increase reliability, and drive efficiency when managing a global value chain. The volume of data created in a global network makes global trade management an ideal area to leverage advanced analytics to drive efficient business operations.

Conclusion

The case studies presented in this document define several real-life applications of advanced analytics in manufacturing supply chain execution. The reality of the situation is that advanced analytics is a critical element of today's manufacturing firm, and there exist innumerable possible scenarios where advanced analytics can provide value for today's manufacturing environment. In fact, the argument can be made that as real-time data becomes more available and our capacity to extract actionable insight in real time increases, we could get to a point where supply execution is far more agile and thus less reliant on short-term supply chain planning.

The Internet of Things is certainly playing a role in the capability of today's business to capture useful information; however, we are still constrained by an increasing gap in our ability to analyze the volumes of data that are available. Moving forward, expect to see a drastic increase in analytic applications developed, many of which will be purpose built (such as in the case of Savi), as innovators will seek to develop solutions tailored to the specific needs of a specific market. The development of such purpose-built analytic applications will continue as the IoT continues to deliver a tremendous amount of data associated with all aspects of today's manufacturing business.

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- *IDC FutureScape: Worldwide Manufacturing Supply Chain 2016 Predictions* (IDC #259782, November 2015)
- *IDC FutureScape: Worldwide Manufacturing 2016 Predictions* (IDC #259783, November 2015)
- *Business Strategy: The Use of Advanced Analytics in Logistics Fleet Management* (IDC Manufacturing Insights #MI258160, August 2015)
- *Perspective: Competing Objectives, Limited Visibility, and Organizational Silos Impede Strategic Decision Making in the Supply Chain* (IDC Manufacturing Insights #MI256357, May 2015)
- *Business Strategy: The Evolution of Manufacturing Supply Chains – Networked, Collaborative, and Transparent* (IDC Manufacturing Insights #MI255229, April 2015)

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