

The era of advanced analytics in procurement has begun

Advanced analytics techniques wring more value from historical purchase data—transforming negotiation tactics, vendor management, and purchasing strategy.

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For procurement departments, information is power. Insights gleaned from historical data on product pricing and vendors can strengthen the buyer's negotiating position and drive better pricing. Few procurement functions are currently making the best use of the huge amounts of data they generate, however.

Why does that matter? Our experience suggests that statistical models and advanced analytics can help procurement departments achieve cost savings of 3 to 8 percent, compared to traditional pricing models. By employing robust data analytics, procurement managers can uncover new insights from data to use in negotiations, vendor segmentation and performance management, and annual purchasing strategy.

Getting more value from procurement data

Procurement functions generate more data than any one employee can track and manage. At one midsize manufacturing company with approximately \$2 billion in annual revenue, for example, procurement had data on more than 20,000 transactions for a single category, each with four to five statistically significant drivers of price.

But the models used by most procurement functions dramatically simplify the available data to make it easier for purchasers to handle. A lot of potentially valuable insights get lost along the way. Take the cost curve. This widely used modeling approach provides an overview of the average price paid to range of vendors over a year. The model is appealingly simple, but averaging prices can obscure the most critical aspects of vendor performance. For, say, an agricultural product with significant seasonal price variation, the highest-price vendor may be the only one that can supply the product only during the high-cost season, giving it no incentive to match others' prices.

The advantages of advanced analytics

Advanced-analytics techniques use algorithms to recognize patterns in complex data sets, allowing procurement analysts to query all their data, determine the statistically significant drivers of price, and cluster the data according to those drivers. The resulting clusters represent a set of purchases without significant differences in cost drivers and thus reveal the real differences in vendor performance.

A crucial advantage is that unlike people, advanced-analytics systems don't bias their decisions based on gut feeling, or place undue weight on outliers in the data. The systems also enable the testing of thousands of permutations very quickly to determine which statistical clusters fit the data best. In the agriculture example, the algorithm would not need to be told that seasonality is a driving force. It will make this determination from the data. If logistics costs also have a big impact, the

algorithm will reveal the distance brackets that make a statistically significant difference.

But advanced-analytics systems can do more than quantify the cost drivers that procurement teams already know about: they can uncover entirely new insights. A recent analysis of vendors revealed one among 400 that was clearly acting as a broker and applying a markup to every sale. With so many transactions, each with four to five significant drivers of price, these subtle trends are nearly impossible to isolate and act on without advanced analytics.

Three use cases for advanced analytics

Three areas—negotiation, vendor segmentation, and yearly planning—reinforce the value that a statistical approach powered by advanced analytics can deliver (see sidebar, “Could your procurement function benefit from advanced analytics?”).

Negotiation

The first step in successful negotiations is to prepare a fact base with information on previous purchases. One manufacturer illustrates the complexity of this task. It spends hundreds of millions of dollars on raw materials through tens of thousands of transactions with hundreds of vendors. Pricing is affected by multiple factors and fluctuates throughout the year, so the manufacturer uses an advanced-analytics algorithm to group historical purchases into statistically significant clusters. This information can then easily be displayed in any format already familiar to the user—typically a spreadsheet.

Advanced analytics enables the manufacturer to quickly identify a cluster of vendors by entering a description of the upcoming purchase (for example, a specific material that is available within 50 miles of the plant). A summary of cluster data highlights the average price of similar purchases, as well as a list of available vendors and the prices they offer. Equipped with a robust, quantitative fact base, the manufacturer can come to the negotiating table with pricing based on historical data and information on vendors that operate in this space. In the first month of using the improved fact-based negotiation approach, the manufacturer’s procurement function was able to achieve an 8 percent reduction in its cluster prices just by driving the highest purchase prices down toward the average.

Vendor management

Vendor segmentation and management is a relationship-oriented endeavor. As such, it is particularly vulnerable to the many biases that affect human interaction. While the personal nature of the relationship remains important, conclusions about vendor performance should be based on data, rather than feelings. Since advanced analytics is especially useful in isolating vendor performance within a cluster, it can help eliminate biases from the evaluation.

Consider a steel manufacturer that buys scrap steel as a major material input for its new steel. The manufacturer has 50 vendors that are spread among 100 statistically significant clusters, and each vendor appears in multiple clusters. Advanced analytics can deliver a snapshot of each vendor’s aggregate performance.

To determine which vendors are the best performers by pricing, the steelmaker can create a scoring system that awards or deducts points for each transaction. For example, Vendor 1 sells a particular grade of automotive scrap, sourced locally for \$100 a ton (landed cost). The cluster average for this scrap is \$120 a ton. Since Vendor 1 sold the steelmaker scrap at a price lower than the cluster average, it receives one point for the transaction. After totaling the vendor scores across all transactions, the manufacturer can plot each vendor on a relative point scale. A high score on this scale indicates a vendor that consistently outperforms the cluster average price and would be a top choice.

Sidebar: Could your procurement function benefit from advanced analytics?

A simple way to identify where advanced analytics could make a big difference in procurement starts with a few short phone calls to buyers, category managers, and VPs. Ask them to answer the questions below.

Negotiations

- Do the buyers use historical transaction data to frame or anchor future purchases?
- Do the buyers have easy access to the data (for example, can they identify the relevant data points and summary statistics in 10 seconds or less)?
- Do the buyers have a factual rebuttal when vendors assert, “But we’re different”?

Vendor management

- Does the organization quantitatively evaluate and rank vendor performance?
- Does the method of evaluation objectively and statistically isolate vendor performance?
- Is the methodology for evaluation consistent across all vendors?

Annual purchase planning

- Does the organization have a comprehensive category strategy in which key decisions between alternatives are linked to historical data?

If the answer to any of these questions is “no”, advanced analytics could unlock significant value.

Yearly planning

Advanced analytics can be particularly helpful in analyzing purchasing data to support a comprehensive sourcing strategy. Let’s say that a chemicals manufacturer identifies 50 clusters for a single raw-material input. It has a good idea on pricing within each cluster, as well as the vendors that routinely offer the best deal. The next step is to decide how to shift volume among the clusters to minimize cost. From a strategic-planning standpoint, a procurement organization might seek to eliminate clusters 45 to 50 and replace with volume from clusters 1 to 10. Purchasing managers might also explore adding new clusters from previously untapped sources. Cluster data will make it clear which clusters offer the best value to help guide the strategy, and vendor performance data will help identify which vendors are the top candidates for increased volume.

Modeling can also inform inventory-carrying decisions. For instance, the chemical manufacturer’s data could show that it pays a 10 percent

premium on spot purchases when its safety stocks are depleted. The procurement team can then make a data-driven decision about whether to pay the carrying cost for additional inventory, or pay a premium price for spot purchases.

Integrating advanced analytics into purchasing

But what does it take to integrate advanced analytics into procurement operations?

The good news is that almost every organization already has the necessary resources and capabilities. If procurement has a record of historical purchases, transitioning from heuristic approximations to data-driven analytics can be accomplished in a few months with targeted efforts in three key areas.

- **People.** Buyers function as the tip of the spear. They don't need to be data scientists or know how to code algorithms; they just need a computer to view the output of advanced-analytics models. A few days of workshops to explain topics such as statistical clustering and how to incorporate them into negotiations can enable the whole procurement function to grasp the fundamentals.
- **Processes.** Procurement functions have access to all of the data they need through existing systems, so processes don't need to be adjusted to facilitate data entry or aggregation. While performing the initial analysis requires expert knowledge (professional guidance is recommended), the algorithm only needs to be run one time. After that, new data can be easily plugged into the assigned clusters that feed the tools on an ongoing basis.
- **Technology.** In many cases, no additional investments in technology will be needed to support advanced analytics. The database to consolidate and house the purchasing data does not need to be fancy. To run the analysis, the database's minimum requirement is a record of historical purchases and data to model cost drivers (for example, price, date, volume, and vendor). Most organizations use some form of ERP software that already offers the required capabilities. The output of the analysis can be used in spreadsheets or other formats that teams are already using.

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For deeper insights into purchasing data and trends, we find that advanced analytics-based systems beat traditional models every time—and the capabilities require little added investment. In most cases, all it takes is a change in mind-set. Since the potential savings from better-informed negotiations are so substantial, procurement functions have no excuse for delay■

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