

MINING THE PAST TO SEE THE FUTURE

CFOs and their teams can use business analytics to make better decisions.

By Gary Cokins, CPIM

The use of analytics to gain insights and foresight for better business decisions is rapidly becoming a mainstream managerial practice. Analytics help organizations make quicker and better decisions and take actions based on those decisions with greater confidence. The pace of reporting information also is accelerating, which means management accountants must detect emerging trends, risks, opportunities, and unexpected events more quickly to enable faster actions.

Articles about “Big Data” and the need for analytics of all flavors (such as correlation, regression, clustering, and segmentation analysis) occur with increasing prominence in information technology (IT) magazines and on websites. Some skeptical IT analysts view applying analytics as a fad or fashion—or as being way overvalued. I believe that an organization’s attainment of evolving analytical competencies will give it a sustainable competitive edge.

A challenge with Big Data will be to distinguish its signal from the noise—to distill what data is relevant vs. irrelevant. The sources of digital data used for analytics are growing exponentially, and the sheer amount of available information can be overwhelming. Fortunately, software tools are helping to drill down, slice, and dice to get to the useful data for decisions. Software is a great enabler, but the key is when, how, and where to apply analytics.

How CFOs Can Use Big Data and Analytics for Better Knowledge

How do business analytics apply to the CFO’s finance and accounting function? It should be apparent that corporate accounting is evolving from its traditional role of collecting data, validating data, and reporting information to a more value-adding role of providing and supporting analysis for decision making. To be clear, the message in this article isn’t about accountants simply getting better with traditional financial analysis methods like cost-volume-profit (CPV) or breakeven graphs and expense-to-sales ratios. The message is to use “deep analytics” to discover relationships to discern knowledge not previously made visible—to bring data and information to our lives.

Management accountants’ progress with analytics has been notable. With the recent explosion of available digital data, management accountants are certainly getting better at measuring more. But are the measures the most relevant ones? Do they answer critical questions to drive growth and profits? The upside potential to applying analytics broadly, not just in finance but across all lines of business, is substantial.

As the CFO’s scope of responsibility broadens with more oversight and as CFOs become that “strategic advisor” so often written about, they have the opportunity to become catalysts for introducing change. This can include leading transformational projects that increase efficiencies, lower costs, and better execute strategies. Accountants traditionally have been reactive, and analytics enables them to be more proactive.

WITH PREDICTIVE ANALYTICS, EXECUTIVES, MANAGERS, AND EMPLOYEE TEAMS CAN BETTER SEE FUTURE DEMANDS, SUCH AS THE VOLUME AND MIX OF PRODUCTS NEEDED TO MEET SALES FORECASTS MORE ACCURATELY.

The trend clearly is toward increased use of analytics and performance improvement methods within the finance function. One example is a shift away from reporting profitability by product and service line toward providing a more encompassing view of channel and customer profitability reporting using activity-based costing (ABC) principles. Another example has been the development of strategy maps to report and monitor both financial and nonfinancial key performance indicators (KPIs). An additional example is a swing from traditional cost-center budgeting and cost variances control toward driver-based rolling financial forecasts using predictive analytics integrated across business processes.

From Predictive Analytics to Prescriptive Analytics

Senior executives are shifting away from a command-and-control style of management—reacting after the fact to results—to a much more anticipatory style of manag-

ing. With predictive analytics, executives, managers, and employee teams can better see future demands, such as the volume and mix of products needed to meet sales forecasts more accurately. As a result, the executives can adjust their resource capacity levels and types, such as the number of employees needed or spending amounts. They also can quickly address small problems before they become big ones. And they can transform their mountains of raw transactional data into information to test hypotheses, see trends, and make better decisions.

For example, Amazon.com has exhibited exceptional uses of predictive analytics by using algorithms based on customer shopping patterns, ratings, and data of other customers with similar preferences. As a result, Amazon can suggest to customers items they would likely be interested in purchasing. At an operational level, Amazon uses weather climate models for more efficient shipping. Walmart monitors social media to determine which items are popular in various geographic regions so it can make sure it ships enough of those products to reduce inventory stockout or obsolescence costs. Retailers like Macy's conduct marketing campaigns and perform promotion analysis to understand the impact of past promotions and to suggest changes that could be applied and adapted to future promotions for better results. Telecommunications companies use analytics to predict churn—the likelihood that a customer will drop service and subscribe with a competing carrier. Accountants include churn in calculating customer lifetime value (CLV), which is used for prioritizing which customers are most attractive to retain and grow.

Now analytics promises to go beyond predictive analytics to *prescriptive* analytics. This advance involves powerful optimization algorithms that may seem like science fiction but in a few years could be commonplace with the more-superior-performing organizations. All of these factors help explain why modeling is an essential skill for management accountants. Modeling is at the heart of analytics and is the representation of how an organization works and how external factors impact it created in a way that the models can be used productively as a means to simulate the real world.

Potential Pitfalls and Cautions

Let's take a step back and be a little cautious with analytics as described in these two paragraphs from the conclusion of a joint research paper published in November 2013 by IMA® (Institute of Management Accountants) and ACCA (Association of Chartered Certified Accountants)

“THE ABILITY TO HELP TELL THE ‘STORY’ OF DATA—IN, FOR EXAMPLE, VISUAL FORM—WILL BECOME ALMOST AS IMPORTANT AS THE ABILITY TO ANALYSE AND INTERROGATE IT....”

tants) titled “Big data: its power and perils”:

“For accountancy, as for most professions, technological change is a double-edged sword. It has the potential to replace or devalue traditional skills, but it also has the potential to help develop new ones. Big data will, over the next 5 to 10 years, create new opportunities for accountants and finance professionals to take a more strategic, more future-facing and more proactive role in organisations...

“It is important, however, to understand the realities of what big data means. Valuing and accounting for big data are likely to be among the biggest challenges over the next 10 years, requiring the development of new metrics and accounting standards. Extracting value from big data, meanwhile, will demand the development of new and different skills. Data science will need to be combined with data art to provide information and insights that organisations can easily access and use. The ability to help tell the ‘story’ of data—in, for example, visual form—will become almost as important as the ability to analyse and interrogate it....”

Organizations will need to recognize that although analytics can provide a powerful way of taking things apart, synthesis is the way of putting things analyzed back together. Framing a problem or opportunity to investigate is also a necessary skill.

To achieve success with analytics will also require accountants to improve their communication skills to describe their findings effectively. A boost to analytics includes displaying the findings in managers' mobile devices with visualization tools, which can include real-time data retrieval for analysis. For example, in a graph, users can “slide” their cursor on a variable, such as sales volume, and instantaneously observe the change in the resulting profit line.

A Different Vision of Analytics

The shortcoming of the examples provided earlier is that they answer only the first of three relevant questions that need to be answered to really transform organizational

performance. They answer only the “What?” question: What do things cost? Where do we make or lose money? Which customers are more or less profitable? How are our KPIs performing against their targets? But this isn’t sufficient. The next two questions also need answers: “So what?” and “Then what?” Organizations need a deeper understanding of the cause-and-effect relationships that drive results, and modeling will be a key skill for answering these two questions.

“So what?” questions require analysis to determine the relevance of reported findings and where to focus. “Then what?” questions require additional analysis that’s predictive in nature to assess the impact or result of decisions that were made based on the answers to the first two questions. Answering “then what?” can involve what-if scenario planning and sensitivity analysis. For example, if the reporting and analysis suggest to terminate less-profitable customers and to focus marketing and sales efforts on specific customer segments, what will be the projected financial outcome? “Then what?” answers validate the quality of proposed decisions.

Analytics as the Only Sustainable Competitive Advantage

For the past few decades, many executives and strategic consulting firms have followed a framework developed by Michael S. Porter, the popular Harvard Business School professor whose writings outline three generic strategies briefly described next. But be aware that, with today’s clock-speed and technology-driven markets and economies, each generic strategy has vulnerabilities.

1. Cost Leadership Strategy. This is accomplished via improving process efficiencies, unique access to low-cost inputs (e.g., labor or materials), vertical supply chain integration (from purchased components to final assembly), or avoiding certain costs. *But* today, by using lean management techniques and data analysis methods, other firms can quickly lower their costs.

2. Differentiation Strategy. This is accomplished by developing products or services that have unique traits that customers value. *But* today, competitors can imitate or replicate products and services (e.g., smartphones), or customer tastes can change more quickly.

3. Focus Strategy. This is accomplished via concentrating on a narrow customer segment (e.g., jewelry from Tiffany’s) that has entrenched customer loyalty. *But* today, broad market cost leaders or “microsegmenters” can invade a supplier’s space and erode its customers’ loyalty.

If the accepted generic strategies are vulnerable, how

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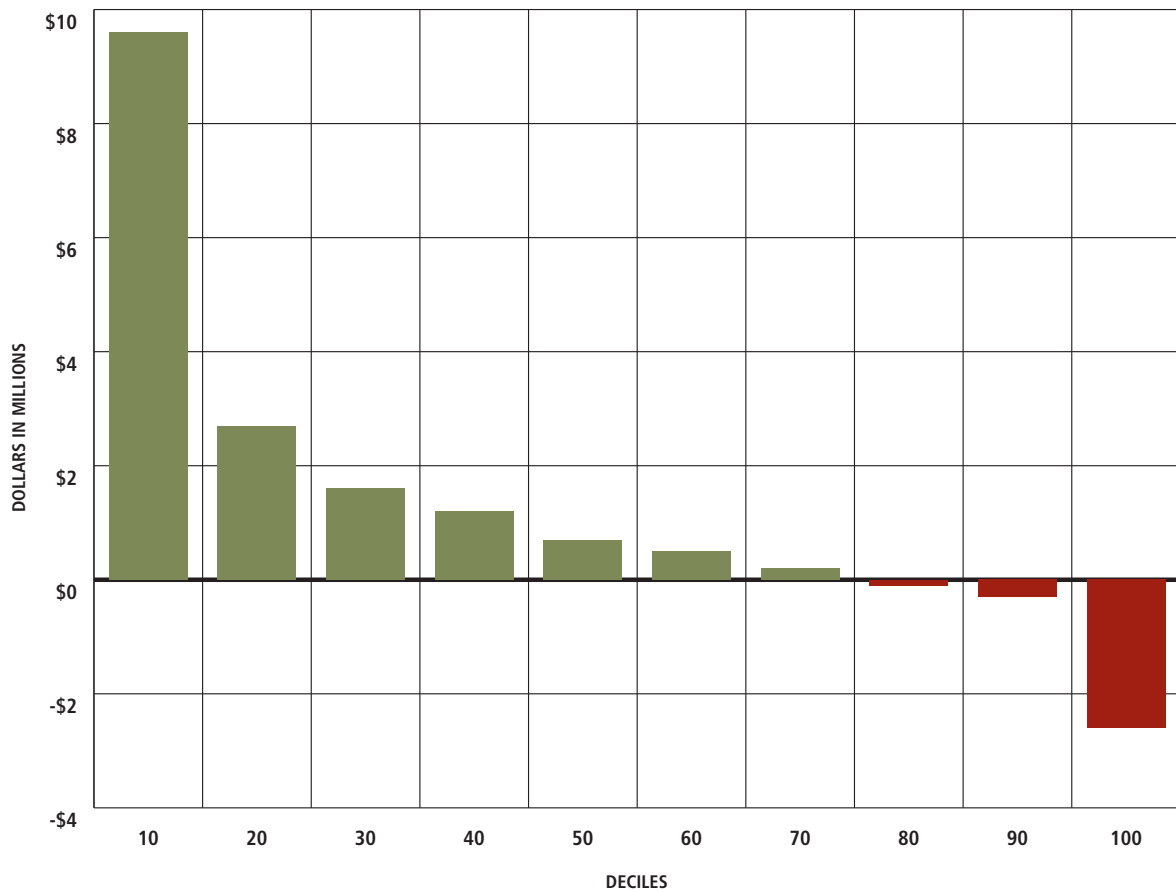
can an organization gain a sustainable competitive edge? Innovation has been heralded as essential for sustaining an organization’s success, but innovation by itself is no longer a dependable source for competitive advantage. As just described, new products and services can be copied quickly, and globalization and the widespread availability of new, affordable technology have lowered the barriers to competition. In my opinion, now that the barriers to applying analytics are getting lower because of affordable software and removal of geographic boundaries, then agility through quicker and smarter decision making will become the best opportunity for attaining a sustainable competitive advantage. This can be accomplished through competency with business analytics, which means creating an organizational culture for investigation, discovery, metrics, and analytics.

Customer Profitability Analysis to Take Action

There’s a trend for customers to increasingly view suppliers’ products and standard service lines as commodities. As a result, what customers now seek from suppliers are special services, ideas, innovation, and thought leadership. Many suppliers have actively shifted their sales and marketing functions from being product-centric to customer-centric through the use of data mining and business intelligence tools to understand their customers’ behavior—preferences, purchasing habits, and customer affinity groups. In some companies, the accounting function has supported this shift by reporting customer profitability information (including product gross profit margins) using ABC principles. Is this enough?

It’s progressive for the accounting function to provide marketing and sales with a reliable and accurate picture of which customers are more profitable and which are less profitable (or even unprofitable). Their company can

Figure 1: Decile Contribution Analysis



also see why—by observing the visibility and transparency of internal processes and their activity costs that yield each customer’s contribution profit margin layers. Sales and marketing people often are surprised to discover that, because of special services or deep discounts, their largest customers in terms of sales revenue aren’t their most profitable ones. Furthermore, a larger subset of customers is only marginally profitable or, worse yet, unprofitable. But a ranking of profit of each customer from highest to lowest doesn’t give all the information as to why there are such wide differences (see Figure 1). It’s a start, but it doesn’t provide all the answers yet. This is where data mining and analytical techniques can answer the “Why?” and “So What?” questions. Data mining is the process of extracting patterns from large amounts of stored data by combining methods from statistics and database management systems.

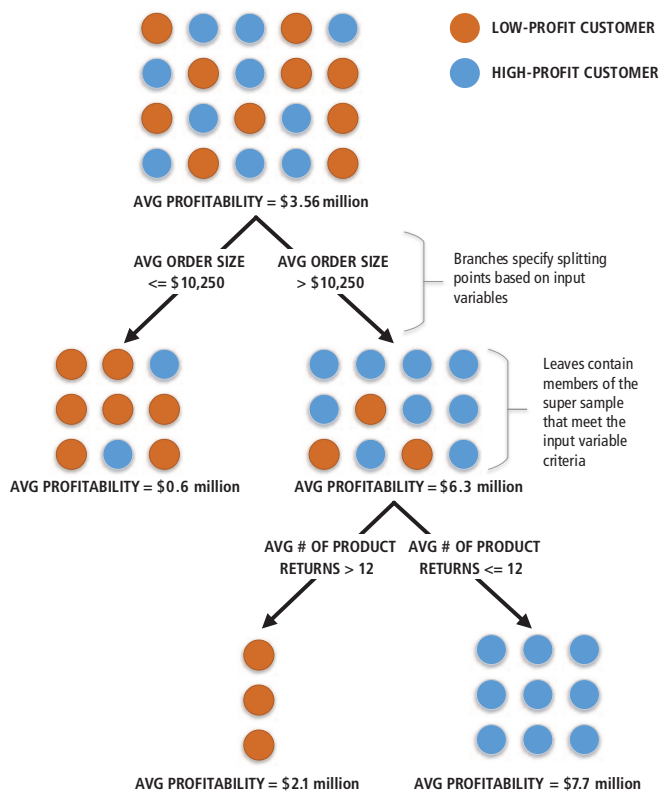
The use of ABC data leads to activity-based management (ABM)—taking actions based on the ABC data. There are some low-hanging-fruit insights available within ABC data. For example, you can see the relative

amounts of activity costs consumed among customers. There also is visibility into the quantity of activity drivers, such as the number of deliveries, which cause activity costs to be high or low. But this doesn’t provide sufficient insight to explain what factors most differentiate relatively highly profitable customers from lower-profit or unprofitable customers.

You can speculate what the differentiating characteristics or traits might be, such as a customer’s sales magnitude or location. But hypothesizing (although an important analytics practice) can be time-consuming. It’s like finding a diamond in a coal mine. In attempting to identify the traits that differentiate between more-profitable and less-profitable customers, the major traits may not be intuitively obvious to an analyst. A more progressive method is to use data mining and advanced statistical analytics to make the differentiating traits clearly apparent.

Recursive partitioning is a data mining algorithm that uses a set of input variables (e.g., number of shipments per order, order size, and/or number of product returns) to split a sample (of customers) based on a desired target

Figure 2: Recursive Partitioning Analysis



variable (e.g., customer profitability). The algorithm creates a “tree” where the “branches” are the splitting criteria and the “branch leaves” are subgroups that meet the branching criteria.

Figure 2 illustrates how this works in a customer profitability analysis context. The customer profit levels are calculated first and become the dependent variable—they result from many factors. The recursive partitioning algorithm then applies each input variable (from the customer master file) to the sample and determines the input variable that most cleanly categorizes between profitable and less- and/or unprofitable customers. In Figure 2, this is the average order size, and the dividing line amount is \$10,250. Then it recursively applies each of the remaining input variables to the subsamples (i.e., “branch leaves”) to categorize them into the more-profitable and less- or unprofitable customers. It continues this process until it reaches a reasonable stopping point. The result is a tree-branch-leaf-subleaves model that describes what differentiates (and why) the profitable from less- and/or unprofitable customers. With this information, marketing and sales actions can be taken to increase any customer’s

profit level. An example would be persuading the customer to order quantities to fill a complete skid of products or whole truck rather than a partial one.

The goal is to accelerate the identification of the differentiating drivers so that actions—or interventions—can be made to achieve a high-payback profit increase from customers. Analysts have been able to generate insightful results by slicing and dicing ABC information from online analytical processing (OLAP) multidimensional cubes. Even greater benefits and better decisions can come from applying data mining and advanced analytics such as comparing different levels of unit costs (e.g., cost per type of purchase order or invoice) among different customers.

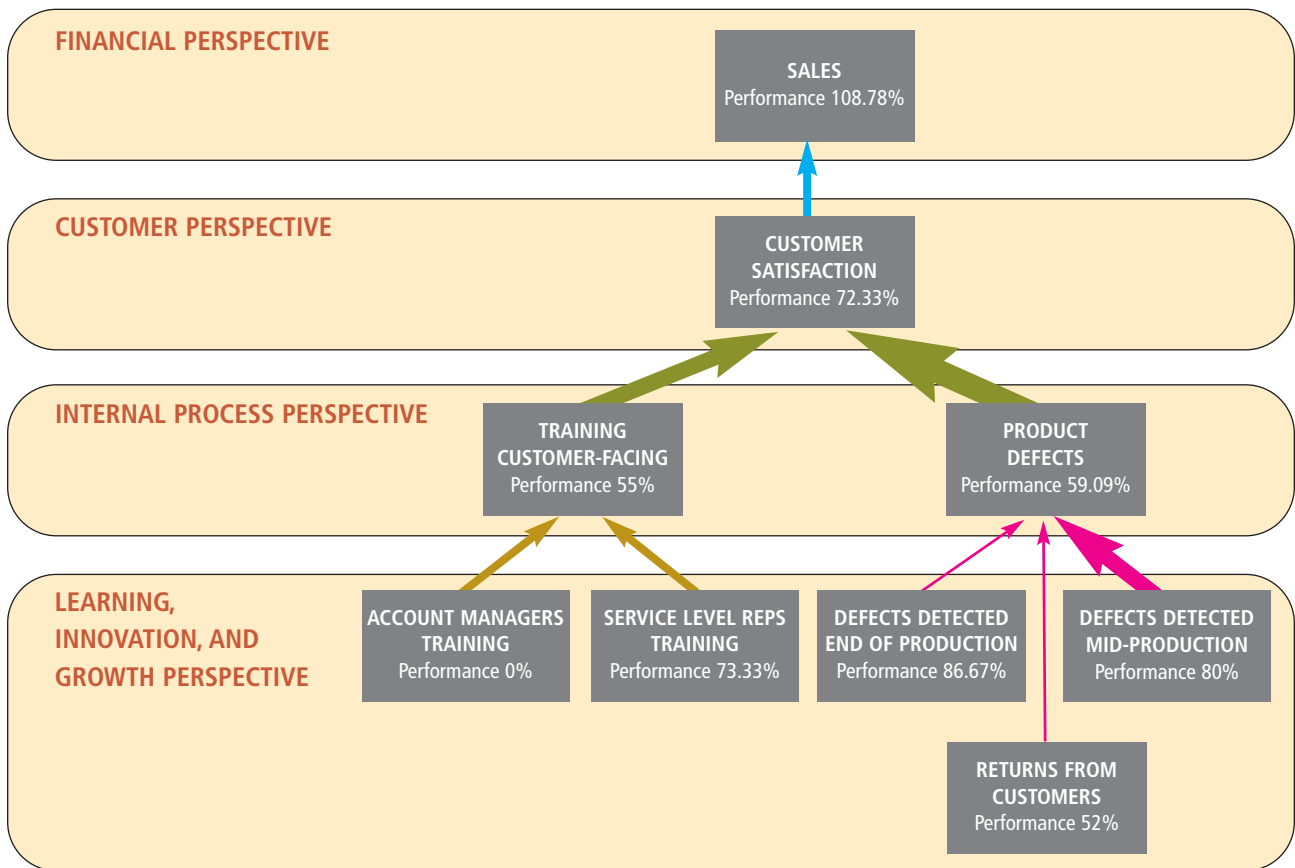
Rationalizing and Validating Key Performance Indicators

How do executives expect to realize their strategic objectives if they only look at reported financial results such as product profit margins; return on equity; earnings before interest, taxes, depreciation, and amortization (EBITDA); cash flow; and other financial results? These really aren’t goals—they are historical results. They are consequences. The objective isn’t about *monitoring* the past summary dials of a balanced scorecard. It’s about *moving* the dials on the operational dashboards by taking actions or completing projects that in turn move the strategic balanced scorecard dials in the right direction.

Worse yet, when measures are displayed in isolation of each other rather than with a chain of cause-and-effect linkages, executives can’t analyze how much the influencing measures affect their influenced measures. As an example, the KPIs of the strategic objectives in the process improvement perspective of a strategy map contribute to accomplishing the strategic objectives in the next-higher perspective, customer loyalty and satisfaction. But how much does each process-related KPI contribute? A little or a lot? This is more than just leading and lagging indicators. Those are timing relationships. A balanced scorecard reports the causal linkages, and its KPIs should be derived from a strategy map. Any strategic measurement system that fails to start with a strategy map and/or reports measures in isolation is like a kite without a string. It has no steering or controlling mechanism.

A misconception about a balanced scorecard is that its primary purpose is to monitor results. That’s secondary. Its primary purposes are to report on carefully selected measures that reflect the strategic intent of the executive team and then enable ongoing understanding as to what should be done to align the organization’s work and pri-

Figure 3: Balanced Scorecard with Embedded Analytics



orities to attain the executive team’s strategic objectives.

The few vital strategic objectives should be articulated in a strategy map, which serves as the visual vehicle from which to identify the projects and initiatives needed to accomplish each objective—in other words, the specific core processes at which the organization needs to excel. After this step is completed, KPIs are selected, and their performance targets are set. With this understanding, it becomes apparent that, on the surface, the strategy map’s companion scorecard serves more as a feedback mechanism to allow everyone in the organization from front-line workers up to the executive team to answer the question: “How are we doing on what is important?” More important, the scorecard should facilitate analysis to also determine why things are going the way they are. As I mentioned, the idea isn’t to just *monitor* the dials but to *move* the dials.

To go one step further, a truly complete scorecard system should have business analytics embedded in it. An obvious example would be correlation analysis in order to evaluate which influencing KPI measures have what degree or magnitude of impact on the KPI measures they

are presumably influencing. Again, is it a little or a lot? Figure 3 displays a balanced scorecard where the thickness of the KPI arrow reflects the degree of explanatory contribution.

Now consider that the thicker arrows (i.e., higher correlation) could suggest the advantages of greater budget funding since those levers appear to drive higher results of other KPIs. With KPI and performance indicator correlation analysis, scorecards and dashboards become more like a scientific laboratory striving toward optimizing an organization’s performance in alignment with its executive team’s strategy.

Which X Is Most Likely to Y?

Business analytics allow organizations to make decisions and take actions they couldn’t do (or do well) without the capabilities of analytics. The finance function can help its line managers and employee teams. Consider these examples:

Increased Employee Retention

Which of our employees will be the next most likely to

resign and take a job with another company? By examining the traits and characteristics of employees who have voluntarily left (e.g., age, time period between salary raises, percent wage increase, years with the organization), business analytics can layer these patterns on the existing workforce. The result is a rank-order listing of employees who are most likely to leave and the reasons why. This allows management's selective intervention.

Increased Customer Profitability

Which customer will generate the most profit with the least amount of company effort expended? As described earlier, by understanding various types of customers with segmentation analysis with recursive partitioning based on data about them (and others like them), business analytics can answer how much should optimally be spent retaining, growing, winning back, and acquiring the attractive microsegment types of customers desired.

These are two examples of the contributions that business analytics can provide. How can an organization “fill in the X and Y blanks”? With business analytics, the best and correct decisions can be made, and organizational performance can be tightly controlled and continuously improved. Without business analytics, an organization operates on gut feel and intuition. The CFO function has the foundational competencies involving quantitative analysis. It's in their nature. They now have the opportunity to strengthen them.

Pushing the Envelope

In its “Value Index: Financial Performance Management 2013—Executive Summary,” Ventana Research confirmed that the gap between current and potential use of analytics remains wide. It reports that information technology should be a particular focus because most finance organizations aren't using IT assets as intelligently as they could. The report refers to the need for a “faster time-to-value” from the CFO function.

Ventana's findings reveal that there “is underuse of technology and overreliance on manual processes.... Many companies use spreadsheets where they should be using purpose-built systems (in planning, budgeting and forecasting for instance). When they do apply information technology, finance departments often focus only on efficiency and neglect opportunities to use IT resources to enhance their effectiveness.... Today, finance departments are challenged to play a more strategic role in their company. This means shifting the focus from executing rote tasks to providing greater analytical and forward-looking

support to other parts of the organization.”

Companies relying on spreadsheets continue to suffer consequences such as an inability to do contingency planning or drill down into underlying data to have true visibility into the root cause of opportunities or issues. The Ventana Research study observes that “several technologies have emerged over the past few years that will be particularly important in transforming the finance function during this decade. One is in-memory computing. Because of its ability to rapidly process computation of even complex models with large data sets, in-memory computing can change the nature of planning, budgeting, forecasting and reviews. It enables organizations to quickly run a set of simulations to understand trade-offs and the consequences of specific events, as well as change the focus of reviews from what just happened to what to do next.” In-memory computing technology enables analysts with “at the speed of thought” iterations and scenario planning analysis rather than their current time-consuming methods.

Truth and Beauty in Numbers

Driving the adoption rate of analytics is the CFO function's opportunity to demonstrate how it can create value for its organization. Pursuing the application of analytics is common sense. Without analytics, insights and understanding for better decision making are limited. Needed facts are masked.

With the courage, will, caring attitude, and leadership traits to take calculated risks and be decisive, executive management teams, including the CFO function, will likely be the initial adopters of a fully integrated analytics-based enterprise performance management system and will achieve its full vision. Other executive management teams will follow them. Ultimately, a well-formulated strategy, talented people, and the ability to execute the executive team's strategy through robust communications are the key to performance improvement. **SF**

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