

Research Brief

Trends and Visions of Analytics in the CFO and Accounting Function

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The CFO finance and accounting function is evolving from its traditional role of collecting data, validating data, and reporting information to a value-adding role of supporting analysis for decision making. Progress has been notable, but still the upside potential is substantial.

Consider the shift from profitability reporting of products and standard service-lines to the more encompassing view of customer profitability reporting using activity-based costing (ABC) principles. Another example is the development of strategy maps to report and monitor both financial and non-financial key performance indicators (KPIs). Additionally, there is a swing from traditional cost center budgeting and variances control toward driver-based rolling financial forecasts using predictive analytics integrated across business processes

The Vision of Analytics: Answering “What? So what? and Then what?”

The vision for how finance can apply analytics takes these activities to much higher levels. They have a shortcoming, however, in that they only provide the answer to the first of three relevant questions that need answers to improve organizational performance. They only answer the “what?” question:

- What do things cost?
- What departments/functions make lose or money?
- What customer segments are more or less profitable?
- How are our KPIs performing against their targets?

In this research brief, we reveal that this alone is not 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. They also need to include probability ranges of projected outcomes.

The “so what?” questions require analysis to determine the relevance of reported findings and where to focus. The “then what?” questions require predictive analysis to assess the impact or result of decisions made based on the answers to the first two questions. For example, if the reporting and analysis suggests to terminate less profitable customers and to focus marketing and sales efforts on specific customer segments, what will be the projected financial outcome? The “then what?” answers validate the quality of proposed decisions.

Evidence of Deficient Use of Business Analytics in Finance and Accounting

CFO.com research¹ reported deficiencies in current uses of analytics in finance. Roughly half of the 231 companies surveyed reported being less than “very effective” at incorporating information for strategic and operational decision making purposes. 36% of the respondents identified management intuition and experience as the primary decision criteria when making strategic and operating decisions. Only 17% said that statistical analysis and modeling are primary decision criteria, and the largest number of respondents (36%) reported that their companies make “little or no use” of more sophisticated techniques.

53% of the respondents said that robust modeling and analytics should play a greater role in their organization’s decision making. Finance executives appear willing to make the kind of investment needed to improve their ability to access and analyze business performance information. 76% of the respondents anticipated that their companies will make at least a moderate investment in linking operational data to financial results.

In research by the IBM Institute for Business Valueⁱ, it reports that the group of surveyed finance functions demonstrating the highest effectiveness across the entire CFO agenda, excel at two capabilities: 1) **finance efficiency brought about by process and data consistency**, which helps unlock the power of analytics; and 2) **business insight to drive enterprise performance**. Note the reference to the “power of analytics.” The study also states that this same group consistently applied five transformation enablers throughout their journey. These are addressing technology, enabling a sequential adoption of standard processes, using new operating models, applying better analytics, and improving workforce efficiency.

The message from these two studies is clear. Analytics is playing an increasingly more important role with the CFO function. Analytics come in many flavors including but not limited to segmentation, correlation, regression, and probabilistic analysis.

Sobering Indication of the Advances Yet Needed by the CFO function

In another research study by The Data Warehouse Instituteⁱⁱ, it states “finance can be a powerful agent of organizational change. It can leverage the information that it collects to assist executives and line of business managers to optimize processes, achieve goals, avert problems, and make decisions.” The study goes on to say “forward-thinking finance departments have figured out how to transform themselves from back-office bookkeepers to strategic advisors.

¹ *Gearing Up for Growth: Financial Analytic Capabilities for Changing Times*; CFO Research Services; May, 2011.

They have learned to partner with the IT department – more specifically, the business intelligence (BI) team – whose job is to manage information and deliver a single version of corporate truth. In so doing, they have liberated themselves from manual data collection and report production processes so they can engage in more value-added activities.” It states that the finance function should be empowered to explore data on their own without IT assistance; and that “armed with analytical insights, the finance department can collaborate with business managers to optimize pricing, reduce inventory, streamline procurement, or improve product profitability. They can help business managers evaluate options, such as whether to add more salespeople, change commission fees, partner with a new supplier, or change merchandising assortments”.

The study makes a sobering statement by saying, “Unfortunately, the majority of finance departments have yet to adopt this new role to a significant degree. Our survey shows that although the finance department has made strides toward becoming a trusted partner with the business, it still has a long way to go. Less than half of financial professionals who responded to the survey believe their finance department, to a high degree, helps the organization “achieve its objectives” (41%), “refine strategies” (35%), “drive sales” (29%), or “optimize processes” (29%). In fact, more than 20% of finance professionals gave their finance teams a low rating in these areas, with a larger percentage saying in effect that the finance department does little or nothing to help the business “optimize processes” (43%) or “understand and help drive sales” (50%).”

Moving from Aspirations to Practice with Analytics

A problem with the research studies referenced is they describe what the CFO function *could* be doing with analytics, with some blunt survey results describing the sizable gap from the possibilities; but they do not provide tangible examples of the vision. Let’s consider a few.

Customer profitability analysis to take actions

There is 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*ⁱⁱⁱ tools to understand their customers’ behavior – their 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 activity-based costing (ABC) principles. However, is this enough?

It is progressive for the accounting function to provide marketing and sales with reliable and accurate visibility of which customers are more and less profitable. Their company can also see why – by observing the visibility and transparency of the internal process and activity costs that yield each customer’s contribution profit margin layers. Often, sales and marketing people are surprised to discover that due to special services their largest customers in sales are not their most profitable ones, and that a larger subset of customers than believed are only marginally profitable – or worse yet, unprofitable. But a ranking of profit – from highest to lowest – of each customer does not provide all the information as to why. See figure 1. It is a start but without giving all the answers. This is where data mining and analytical techniques can answer the “why and so what” questions.

figure 1

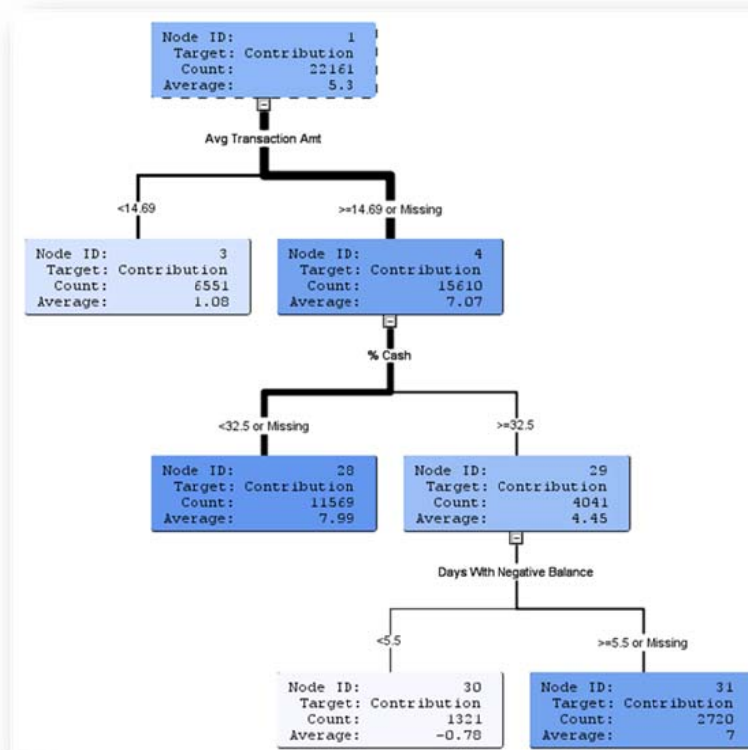


The use of ABC data leads to activity-based management (ABM). There are some low-hanging fruit insights from ABC data. For example, one can see relative magnitudes of activity costs

consumed among customers. There is also visibility into the quantity of activity drivers – such as the number of deliveries – that cause activity costs to be high or low. But this does not provide sufficient insight to differentiate relatively highly profitable customers from lower-profit or unprofitable customers.

One 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 – like finding a diamond in a coal mine. One cannot flog the data until it confesses with the truth. In attempting to identify the differentiating traits between more and less profitable customers, the major traits may not be intuitively obvious to an analyst. A more progressive technique is to use data mining and advanced statistical analytics techniques. This involves the use of segmentation analysis based on decision trees and recursive partitioning. See Figure 2. These techniques can give the sales and marketing functions insight into what actions, deals, services, and other decisions can elicit profit lift from customers.

figure 2



The goal is to accelerate the identification of the differentiating drivers so that actions – or interventions – can be made to achieve that high-payback profit lift from customers. Analysts using ABM have benefited from applying online analytical processing (OLAP) multidimensional cubes to slice and dice data. Even greater benefits and better decisions can come from applying data mining and advanced analytics.

Rationalizing and validating key performance indicators in a strategy map and balanced scorecard

How do executives expect to realize their strategic objectives if all they look at is financial results like product profit margins, return on equity, earnings and interest before interest, taxes, depreciation, and amortization (EBITDA), cash flow, and other financial results? These are really not goals – they are results and consequences. Measurements are not about monitoring the summary dials of a balanced scorecard. They are about *moving* the dials of the operational dashboards that actually move the strategic balanced scorecard dials.

Worse yet, when measures are displayed in isolation of each other rather than with a chain of cause-and-effect linkages, then one cannot analyze how much influencing measures affect influenced measures. This is more than just leading indicators and lagging indicators. Those are timing relationships. A balanced scorecard reports the causal linkages, and its key performance indicators (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. There is no steering or controlling.

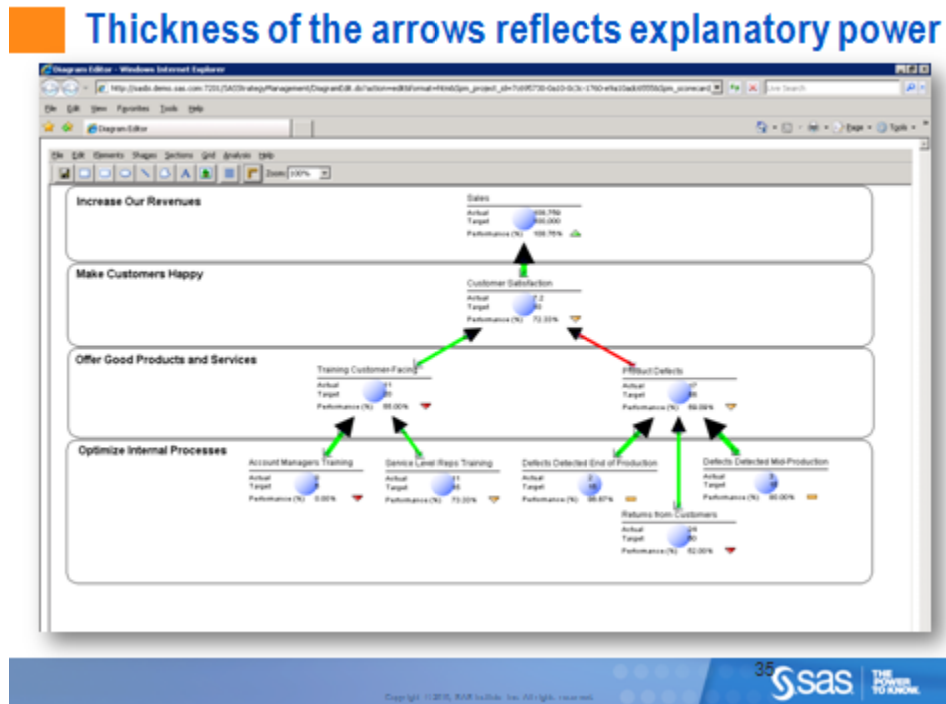
There is confusion about what the difference is between a balanced scorecard and a dashboard. There is similar confusion differentiating key performance indicators (KPIs) from normal and routine measures that can be referred to as just performance indicators (PIs). The adjective “key” of a KPI is the operative term. An organization has only so many resources and energy to focus. KPIs are what distinguish the signal from the noise – the measures of progress toward strategy execution. As a negative result of this confusion, organizations are including an excessive amount of PIs in their scorecard system that should be restricted to KPIs. When someone says our organization has 300 KPIs, one must ask them, “How can they all be a “K”?”

A misconception about a balanced scorecard is that its primary purpose is to monitor results. That is secondary. Its primary purposes are to report the 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 priorities to attain the executive team’s strategic objectives.

The vital and few strategic objectives should ideally 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, or the specific core processes in which the organization needs to excel. After this step is completed, then KPIs are selected and their performance targets are set. With this understanding, it becomes apparent that the strategy map's companion scorecard, on its surface, 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 importantly, the scorecard should facilitate analysis to also know why. As mentioned, the idea is not 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 to evaluate which influencing measures have what degree of explanatory contribution to influenced measures. See figure 3 of a balanced scorecard where the thickness of the KPI arrow reflects the degree of explanatory contribution.

figure 3



With KPI and PI correlation analysis, scorecards and dashboards become like a laboratory to truly optimize size and complexity.

Moving possibilities to probabilities with analytics

What could possibly happen to an organization's performance results? At the operational level, sales order volume could be up or down. Prices of purchased commodity materials like steel or coffee could be up or down. On a strategic macroeconomic level, consumer demand could be up or down. From a risk management perspective, weather fluctuations could adversely affect the best laid plans.

How could you know the impact, including the financial impact, as these possibilities occur at various levels? There are three broad ways: a single best guess; the worst, baseline, and best likely outcomes; and a probabilistic scenario of the full range of outcomes. They all include predictions with analytics.

1. Single best guess

Most organizations plan for results based on their manager's best estimates. For example, in the annual budgeting exercise managers forecast sales mix volume, labor rates, and prices of purchases. Each is a single point estimate, and the accountants aggregate them to produce a single budget.

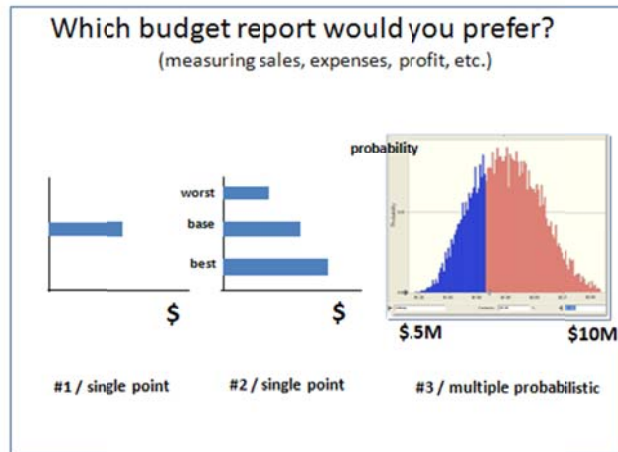
2. Worst, baseline, and best likely outcomes

The more advanced organizations consider three ranges of outcomes: worst, baseline, and best likely outcomes. Separate predictions are made for the key variables in the plan. Then the three overall possibilities are calculated. This provides a sense of the range of outcomes. These organizations might individually test the sensitivity of the key variables by increasing or decreasing one of them – one at a time.

3. Multiple probabilistic scenarios

The most advanced organizations take this process to its ultimate limit: from three scenarios to the full range of possibilities. That is, they estimate the probability distribution of each variable, perhaps as percentage increments from the base (e.g., -20%, -10%, 0% base, +10%, +20%). By combining these, they move from the three single point outcomes to viewing a distribution curve of dozens and conceivably hundreds or thousands of outcomes. The benefit is they can have more certainty of the increasingly uncertain world they operate in. In addition, the variables become understood as "drivers" of the results where the level of each one may be able to be proactively managed in advance of their occurrence. These three levels are illustrated in Figure 4.

figure 4



The breadth and granularity of the distribution curve increases as the probability ranges for each variable is segmented, as more variables (not just the key ones) are added, and as each variable is sub-divided (e.g., from a product family to its individual products). The three-scenario approach gives a limited view of risk in contrast to the multiple probabilistic distribution curve. With the latter, sensitivity analysis can become very refined, including automated increases and decreases of each variable to determine which variable drivers are more impacting.

Now take this process to an even higher level by increasing the time interval frequency of re-forecasting one or more (or even all) of the variable drivers. What influences the accuracy and quality of the distribution curve? A critical one is the forecasting of each variable. If the baseline is way off, then incrementing it up or down is also going to include error.

To achieve this "best practice" approach requires a combination of advanced analytics, reliable forecasting techniques (e.g., *monte carlo* methods), and a powerful computational software engine. If this is supplemented with robust reporting, visualization, and analytical power then it is nirvana. The full range of probabilistic outcomes can be viewed and at more frequent time intervals approaching near real time. The benefits are endless. Risk management becomes scientific. Rolling financial forecasts replace static and fixed-in-time annual budgets that quickly become obsolete. Drivers can be proactively managed such as supply chain logistics and inventory management.

Predictive analytics is becoming a “hot” term with enterprise performance management. With this opportunity to move from just discussing the possibilities to understanding the factors impacting your organization and also taking actions based on the interdependent probabilities, is anyone surprised? The organization shifts from possibility to probability – managed probability – of outcomes.

Fill in the blanks: Which X is Most Likely to Y?

Business analytics allows organizations to make decisions and take actions they could not do (or do well) without the analytics capabilities. The finance function can assist 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 raise, years with the organization, etc.), business analytics can layer these patterns on the existing work force. The result is a rank order listing of employees most likely to leave and the reasons why. This allows managements’ selective intervention.

Increased customer profitability

Which customer will generate the most profit from the least effort? As just described, 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 can optimally be spent retaining, growing, winning back and acquiring the attractive micro-segment types of customers that are desired.

Increased product shelf opportunity

Which product in a retail store chain can generate the most profit without carrying excess inventory but also not having periods of stock outs? By integrating sales forecasts with actual near real time point-of-sale checkout register data, business analytics can optimize distribution cost economics with dynamic pricing to optimize product availability with accelerated sales throughput to maximize profit margins.

These are three examples of the contribution that business analytics can provide. How can an organization “fill in the blanks”? One can think of hundreds of other examples where the goal is to maximize or optimize something. 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; and optimization cannot even be in that organization's vocabulary. The CFO function has the competencies involving quantitative analysis. It is in their nature.

The CFO Function Needs to Push the Envelope

Research by Ventana Research^{iv} has 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 are not using IT assets as intelligently as they could. In particular, the finance function often focuses only on efficiency and neglects opportunities to use IT to enhance their effectiveness. Finance functions have made considerable progress in addressing their basic information needs (referred to as 20th century reporting requirements), but most are a long way from providing the more complete, next level of information that can be used to improve performance (their 21st century requirements).

The benchmark research of this study shows there is important information that employees could receive – or already do receive – that would improve their organization's performance and help align its actions to strategy. Information deficits combined with poorly designed processes can limit severely how well all departments, including the finance function, do their jobs. The study's recommendations are that CFOs and senior finance department executives focus on these three areas:

- Push the envelope when it comes to management reporting. To improve performance, companies must link more operational and financial data, make information available sooner and provide a richer set of data including leading indicators for the business unit and relevant information about competitors, suppliers and factors that drive demand for the company's products or services.
- Have a disciplined, sustained process in place to address information technology barriers, especially infrastructure complexity, and to enhance the use of ERP systems. Typically these are the root causes of issues preventing finance organizations from improving process execution and preventing the disconnections that obstruct better alignment of strategy and execution.
- Assess where there are shortfalls in the people, process, information and technology dimensions of key financial functions, then define a plan with specific objectives and timetables that addresses these shortfalls.

Pursuing the application of analytics is common sense. One could argue that this study omitted as a root cause barrier the natural resistance to change and preference for the status quo. Without analytics, insights and understanding for better decision making is limited.

Truth and Beauty in Numbers

Quantitative analysis will become a mainstream competency for the organizations that will excel with sustained performance improvement. Here is short narration by the great Princeton University mathematician and Nobel Prize winner John Nash. Nash introduced a theory describing how rational human beings should behave if there is a conflict of interest. In the Academy Award-winning movie about Nash's life, *A Beautiful Mind*, he said:

“I like numbers because with numbers, truth and beauty are the same thing. You know you are getting somewhere when the equations start looking beautiful. And you know that the numbers are taking you closer to the secret of how things are.”

The executive management teams, including the CFO function, with the courage, will, caring attitude and leadership traits to take calculated risks and be decisive, 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.

ABOUT THE AUTHOR

Gary Cokins is an internationally recognized expert, speaker, and author in advanced cost management and performance improvement systems. He is principal consultant of global business advisory services involved with performance management solutions with SAS. Gary received a BS degree with honors in Industrial Engineering/ Operations Research from Cornell University in 1971. He received his MBA from Northwestern University's Kellogg School of Management in 1974.

Gary began his career as a financial controller and operations manager for FMC Corporation, and he has been a management consultant with Deloitte, KPMG, and Electronic Data Systems (EDS). Gary's third book, *Activity Based Cost Management: An Executive's Guide* has ranked #1 in its topic on Amazon.com. His two most recent books are *Performance Management: Finding the Missing Pieces to Close the Intelligence Gap* and *Performance Management: Integrating Strategy Execution, Methodologies, Risk, and Analytics*.

ⁱ Journey to a Value Integrator; IBM Institute for Business Value;

ⁱⁱ Transforming Finance: How CFOs Use Business Intelligence to Turn Finance from Record Keepers to Strategic Advisors; The Data Warehouse Institute; First Quarter, 2010.

ⁱⁱⁱ Data mining is the process of extracting patterns from large amounts of stored data by combining methods from statistics and database management systems. It is seen as an increasingly important tool by to transform unprecedented quantities of digital data into meaningful information, nicknamed business intelligence, to give organizations giving an informational advantage. It is used in a wide range of profiling practices, such as marketing, surveillance, fraud detection, and scientific discovery.

^{iv} Financial Performance Management in the 21st Century – A CFO's Agenda for Using IT to Align Strategy and Execution; Ventana Research; 2007.