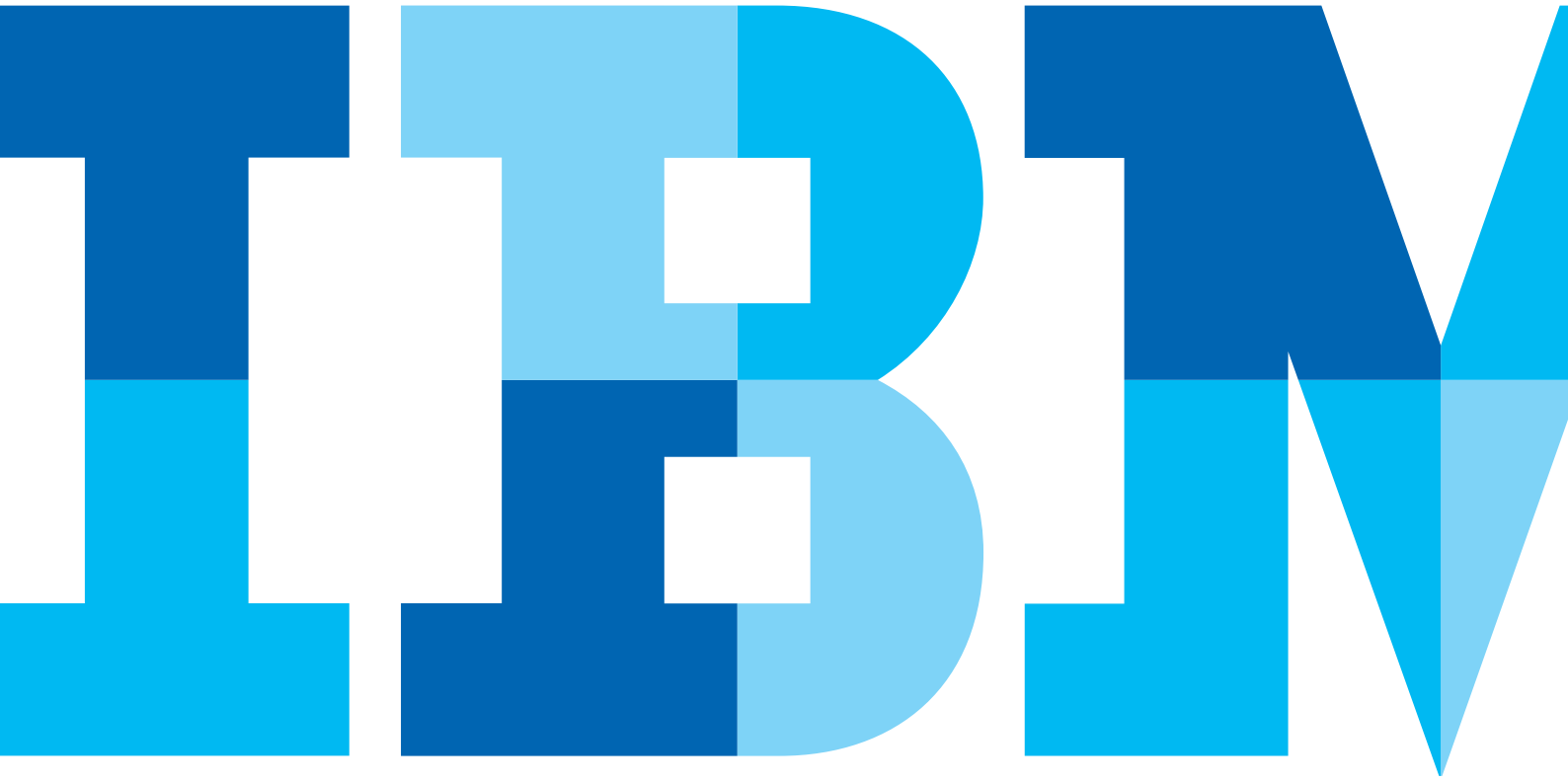
Five Advanced Practices for More Robust Forecasting

By Steve Player and Steve Morlidge, Beyond Budgeting Round Table



Executive summary

What differentiates finance organizations with leading-edge rolling forecasting capabilities from the rest of the pack?

Forecasting "leaders" begin by addressing common forecasting pitfalls and adopting healthier practices.

(For more information, see the first two white papers in this series, "Seven Symptoms of Forecasting Illness" and "Business Forecasting: Six Design Principles for Healthier Forecasts.")

Next, these leaders strive to spend less time on lower-value activities, such as manually collecting, preparing and reconciling data, and more time on advanced activities, such as:

- Establishing mature workflows
- Deploying tools that help their companies "look ahead" more reliably
- Enabling their organizations to be much more responsive to risks and opportunities so that decision-makers can anticipate and shape business outcomes more effectively

By liberating internal resources from the time-intensive, headache-inducing rigmarole of the traditional budgeting process, rolling-forecast-equipped financial functions can pursue a number of advanced practices that further improve their companies' performance.

Key takeaways

1. Organizations that have addressed common business forecasting pitfalls and implemented healthy practices can turn their attention to developing advanced forecasting practices that driver greater value.
2. Companies with the most robust forecasting capabilities typically rely on one or more of these advanced practices: predictive logic diagrams, advanced measurements, scenario planning, Monte Carlo simulations and advanced technology.
3. Each of these advanced practices can help companies achieve advantages by responding to changing business conditions quicker than competitors. Faster response time can improve risk management and the leveraging of upside opportunities.

This white paper examines the components and benefits of five advanced practices:

- Genome mapping for forecasting: Predictive logic diagrams
- Using and understanding "financial MRIs": Advanced measurements
- Treatment protocols: Scenario planning
- Preventative screening: Monte Carlo simulation
- Electronic medical records for finance: Advanced technology

Many organizations that use these advanced practices have also been able to create greater effectiveness by operating without the need for annual budgets (that is, they become Beyond Budgeting implementers[1]).

Introduction

Planning is bringing the future into the present so that you can do something about it now.

—Alan Lakein, author and personal time management expert

How do companies develop leading business forecasting capabilities?

The answer involves a combination of process improvements, savvy personnel, supporting technology and, of course, a commitment.

The commitment is required because the implementation of advanced practices—the sort that differentiate business forecasting leaders from the rest of the pack—typically occurs only after the organization has rooted out forecasting "malpractices" and then adopted healthier practices.

With that foundation in place, companies have a luxury their competitors frequently lack: financial analysts and managers who spend less time chasing down data and more time adding value with advanced forecasting practices. This paper examines five of those advanced practices:

- Genome mapping for forecasting: Predictive logic diagrams
- Using and understanding "financial MRIs": Advanced measurements
- Treatment protocols: Scenario planning
- Preventative screening: Monte Carlo simulation
- Electronic medical records for finance: Advanced technology

It is important to keep in mind that organizations that excel in one of these advanced areas do not necessarily excel in all areas. For example, some companies might adopt a robust advanced measurement strategy while electing not to use Monte Carlo simulations or predictive logic diagrams. On the other hand, a company might possess robust scenario planning capabilities yet remain in dire need of better supporting technology. The right approach depends on the unique needs of the organization.

Companies with the most advanced business forecasting capabilities typically embrace one or more of these practices, which can be implemented in any order *after* forecasting illnesses have been removed and a foundation of healthy practices has been established.

Future Ready

Much of the discussion in this white paper, as with the other papers in this *Business Forecasting* series, is inspired by a collaboration between the IBM Cognos Innovation Center for Performance Management and Steve Player and Steve Morlidge, authors of *Future Ready: How to Master Business Forecasting* (Wiley, 2010). The book's premise is a straightforward one: When making decisions, organizations cannot rely solely on information about what has happened. Instead, companies also need information about what its managers believe might happen—information that is generated from the process of forecasting. To date, the bulk of business forecasting practices have ranged from ineffective to downright crippling. No company, and no individual, can predict the future with complete certainty. Therefore, the objective of business forecasting should be to become "Future Ready." Companies can do this by systematically and rationally assembling information that gives managers forward visibility regarding likely outcomes as well as the potential losses and opportunities (i.e., the risks) associated with these outcomes.

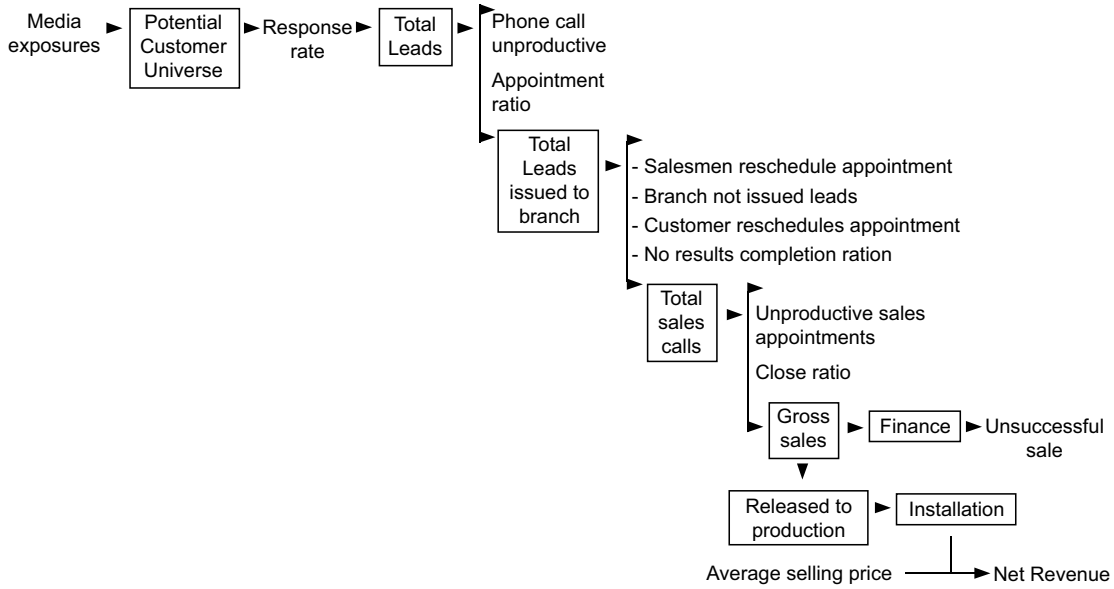


Figure 1. PLD diagram

Genome mapping for forecasting: Predictive logic diagrams

One of the key differences between companies with competent forecasting capabilities and those with advanced forecasting capabilities centers on the timing of their analysis: *when* do we know where our performance is trending and how much time do we have to use that knowledge to influence current performance?

Organizations that gain this knowledge quicker (in some cases, immediately) and with greater lead time have the benefit of being able to exert greater influence on future performance. Many companies, however, maintain a forecasting approach whereby their useful insights and recommendations only materialize after the monthly close. Additionally, many finance functions invest more time and energy looking backwards—to figure out why actual performance varies from past estimates—than they invest in looking forward. Lead time marks an important concept in looking ahead: The faster and more precisely finance can recognize leading indicators of change, the more quickly and effectively they can help the organization respond and adapt to these changes.

On a personal performance level, we would all rather have important genetic indicators at a point in time when we can act on that information by modulating our diet, exercise patterns and other important determinants to actively shape our future health. Fortunately, several practices can help organizations develop more timely insights on which to base guidance and recommendations designed to influence current performance.

Predictive Logic Diagrams (PLDs) are one such analytical tool.

PLDs are charts (Figure 1) that enable or, in some cases "nudge" managers to reanalyze the operating decisions that produced specific performance outcomes. The diagram essentially deconstructs a key performance outcome, such as net revenues, into all of the major, discrete activities that occurred in a sequence to produce the outcome.

In many ways, this exercise forces finance managers to think and act more like operating managers. Indeed, a PLD frequently inspires finance and accounting managers to focus on activities that they did not previously consider. For example, when a consumer packaged goods company started using predictive logic diagrams, the organization's finance managers discovered that their traditional focus on the age of receivables and inventory turns turned out to be less important than the "age" of leads in the company's "lead bank" (the inventory of potential customers).

A PLD is also a surprisingly flexible tool in practice. Suppose a company identifies $1 million that can be invested to improve its operations; a PLD can help the organization identify where to apply the money to generate the highest and/or quickest returns. So, if the PLD showed finance managers that the sales close (sometimes referred to as the conversion rate from lead to revenue) turned out to be a bottleneck, the $1 million is probably best invested in sales training and support to help convert more rapidly all the leads currently languishing in the company's lead pipeline.

On the other hand, if the $1 million were invested in marketing and advertising, the returns would likely be lower (or, at the very least, take much longer to realize) because the company would still face the same bottleneck in converting sales leads to new business and revenues. A PLD can help finance managers peer into their organizational DNA and identify the leading indicators of financial performance. This in turn can help finance produce timely insights that can help their companies immediately anticipate (future) performance with enough lead time to assess alternatives and enable effective execution.

Using and understanding "financial MRIs": Advanced measurements

The first magnetic resonance image appeared in 1973. Since then, magnetic resonance imaging (MRI) has become a staple of healthcare because of the clarity the technology provides physicians. The clarity, which stems from the production of *credible* information about the current state of a human body, is generated entirely by the signal MRI technology produces.

These very same concepts, credibility and signal-based information, define the advanced measurements that help comprise the most robust business-forecasting processes. Advanced measurements, such as run charts, help organizations with a task that is absolutely crucial to robust forecasting: distinguishing between signals and noise. By doing so, organizations can properly measure the stability and reliability of their forecasts and then improve their forecasts so that they can make better projections into the future.

Run charts are useful advanced measurement tools for beginning the assessment of the quality of a forecast process. Run charts provide value in that they help combat two flaws that routinely

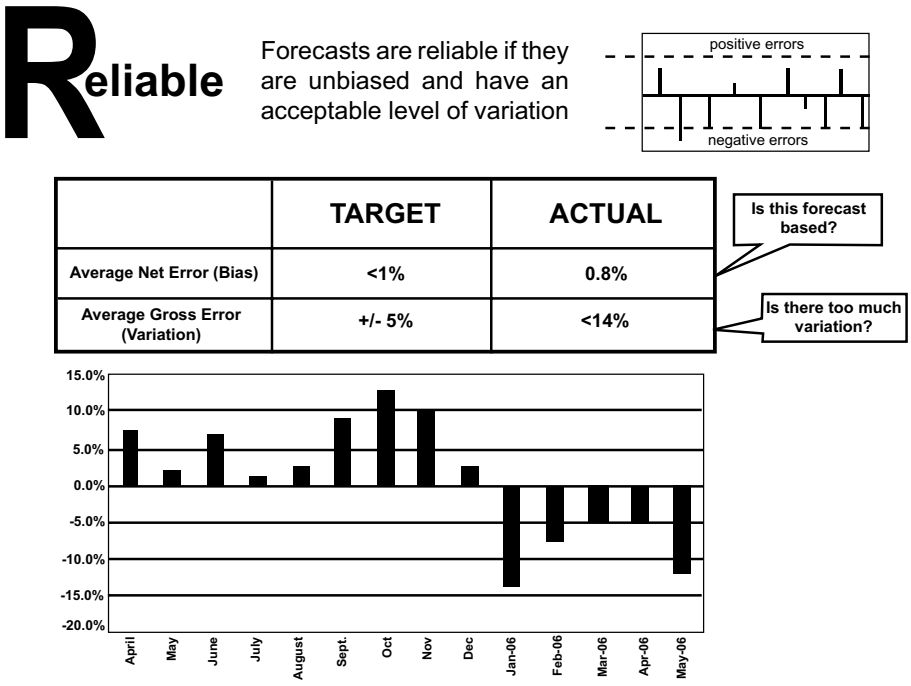


Figure 2. Reliable forecasts

weaken many forecasting measurement attempts: overreacting to incomplete information and neglecting to respond to useful information. This graphical representation simply plots data over time and helps those who use it differentiate between snapshots (or noise) and meaningful information (signals).

Organizations should track the data over time to understand the stability of the process (detected by its standard deviation). Any measurements occurring in that range are part of the normal process. When organizations react to those individual measurements, they are reacting to noise rather than to useful signals. Instead, organizations should observe trends developing over time, which provide useful signals of where performance is heading.

This understanding helps finance managers evaluate the stability of their forecasting process. Equipped with this understanding, finance managers can address important questions about the quality (for example, *can we improve the precision of our forecasting?*) and credibility (for example, *has any bias crept into our forecasting process* and, if so, *how can we eliminate this bias?*).

In practice, forecasting quality is rarely measured; when it is, the measurements often are inaccurate because they are based on noise produced by single data points. If a company makes significant process overhauls based on inaccurate forecasting measurements, the organization suffers twice: once from the disruption and once from the creation of a new process based on faulty reasoning.

To be effective, forecasting measurement should:

- Analyze forecast error, which includes bias and variation (both controllable and uncontrollable variations).
- Rely on consistent units of measure (including units of time, forecast periods and lead times, that is, the elapsed time from forecast to the onset of the forecast horizon).
- Take place before decisions made in response to forecast take effect.

Advanced measurements involve a number of important and, in some cases, complex concepts, such as variability, variance analysis, bias, mean average percentage error, portfolio effect and more. Therefore, it is important to keep in mind how forecasts influence organizational behavior. By developing forecasts, organizations create a performance expectation based on current plans and assumptions. For this reason, advanced measurements of forecast performance can serve as a powerful way to influence behavior throughout the enterprise.Control charts are another highly advanced way to influence organizational behavior. Control charts apply statistical analysis to trend lines to determine the magnitude of variation and whether or not that variation falls within an acceptable range. This information helps managers identify opportunities where greater control can be applied.

Just as physicians and their patients make crucial recommendations and behavioral adjustments in response to MRIs, so, too, do finance managers and their operational colleagues make crucial adjustments in response to highly credible forecasts.

Treatment protocols: Scenario planning

One of the most debilitating maladies that strikes corporate finance functions and cripples their companies consists of a three-pronged "what if?" failure. Too many organizations fail to ask "what if?"; fail to take into account all of the necessary metrics (and the interplay among different metrics) when developing scenarios and fail to create a sufficiently broad array of contingency plans to enact should the "unexpected" occur. The net result is that these companies are not prepared to respond to threats and opportunities quickly. Given the accelerating pace of change, these shortcomings pose growing danger.

Just as physicians prepare several treatment protocols in advance that can be used, depending on the tests results and the ultimate diagnosis, so, too, should businesses integrate scenario planning into their forecasting process.

Scenario planning in action

The business model and management philosophy of Dimensional Fund Advisors helped it avoid staff reductions during the 2008-2009 recession. Scenario Planning gave the asset management firm the confidence and clarity it needed to ride out the economic storm.[2]

"I don't believe in traditional budgeting, and I wouldn't want to work anywhere they do a budget," notes David Martin, the CFO and Vice President of Dimensional Fund Advisors. "I've always been a believer in producing fairly current forecasts and, if at all possible, multiple scenarios coming off that forecast so that you're not surprised by events."

Martin's general approach to scenario planning during a downturn consists of five high-level steps:

1. **Identify targets**. The finance team identifies performance targets, such as profit margins, bonus targets, loan covenants (for example, a specific interest coverage ratio), that the company needs to achieve regardless of revenue declines.
2. **Develop scenarios**. Management then strives to produce about four "what-if" conditions that center on revenue and duration: *What if our revenue drops 25 percent in one month? What if our revenue declines by 15 percent and remains there for 12 months?* Martin points to the value of investing more time and effort developing negative scenarios, including what essentially amounts to a worst-case situation in which cash flow declines to zero.

The objective of scenario planning is to "make strategic decisions that are plausible for all possible futures," emphasizes Peter Schwartz, author of *The Art of the Long View* (Currency Doubleday, 1996). Despite a prevalent misperception, the goal of scenario planning should not be to bet on a prediction about a particular future.

By imagining what *might* happen, finance managers can also identify how the company will respond if "might" appears likely to become a reality (see "Scenario planning in action"). This explains why effective scenario planning contains several components:

- The scenarios (or possible futures) that identify opportunities and well as risks
- A list of the constraints or targets (for example, profit margins, loan covenants, credit terms and so forth) that must be addressed achieved even when revenue drops.
- A list of leading indicators that hint at the onset of each scenario (as well as an understanding of how these indicators influence each other)
- Contingency plans that identify the steps the company will take in response to each scenario to provide a greater opportunity of achieving its desired performance targets

How many scenarios should be identified? A useful range is four to seven.

Regardless of the exact number of scenarios an organization develops, the range should include extremes: *what is the worst possible scenario that might occur and what is the most optimistic possible future outcome?*

3. **Collaborate with business partners**. Finance shares the scenarios and targets with each business group and asks them to identify steps they can take to offset in the revenue declines in each scenario.
4. **Review responses**. Martin sits down with his executive team to review the responses of the business groups and then works with individual groups to finalize their responses to ensure that their plans don't contain any potential problems and align with corporate strategy. "For example," Martin explains, "we might return to one group and say, 'We agree with 85 percent of your plan, so we want you to cut 17 percent rather than 20 percent in this specific scenario.'"
5. **Finalize the playbook**. Martin and his team complete the "playbook," which identifies several sets of cost-reduction steps the company will take should specific scenarios take place. For example, if revenue declines by 15 percent, actions might include restrictions to travel and entertainment and new hiring activity. A more painful scenario such as a massive revenue decline might call for renegotiating loan covenants with banks (prior to violations, when the company has more leverage).

"While you can never know exactly what's going to happen, continuous planning enables you to be much more prepared regardless of what happens in the future," Martin adds. "If something bad happens in the market, you don't have to call an emergency meeting followed by a political free-for-all to determine where cost cuts are going to occur."

By identifying these extremes and developing response plans for them, finance managers not only stimulate creative thinking, they also identify possible contingency steps or plans that might make sense to implement even if the extreme outcomes never occur. For example, although the liquidation of underperforming assets might figure as a prominent step in a worst-case scenario (where cash flow becomes linked to survival), savvy finance managers can view the same step as a wise move in a rosier scenario, or even right now, when the cash from the sale of the underperforming asset can be invested in a high-growth initiative.

Comprehensive scenario planning delivers at least three advantages:

- It enables an organization to avoid potential catastrophes altogether.
- It sensitizes management to what might occur and, as a result, can help management identify both problems and opportunities earlier than it might have had it not conducted scenario planning.
- It spurs organizations to think through "what we would do if" and to create plans that can be rapidly implemented if a scenario actually comes to fruition.

Preventative screening: Monte Carlo simulation

First introduced to corporate finance in the mid-1960s, Monte Carlo methods were primarily used in the financial services sector to assess better the uncertainties that could affect the value of investment portfolios.

The emergence of statistical analysis software applications has more recently introduced Monte Carlo simulations to financial analysts in all industries; these finance managers rely on the simulations to bolster the effectiveness of financial modeling. As management teams evaluate more advanced degrees of risk, they typically discover that potential situations affect multiple variables. As a result, more management teams are relying on Monte Carlo simulation methods, approaches that rely on repeated random sampling to compute results. Monte Carlo simulations are particularly useful for modeling (and valuing) phenomena in areas where significant uncertainty abounds.

Monte Carlo simulation has been described as the opposite of "what if" scenario planning, which is a helpful description. In the "what if" approach, a limited number of single-point estimates are evaluated using a deterministic modeling of each estimate: if the variable is at "x" then the likely effect is "y." Finance managers select which scenarios are likely and less likely to occur.

With Monte Carlo simulation, a random sample of probable estimates is calculated in the model, yielding hundreds of possible outcomes. These results provide the probabilities of different potential outcomes.

Monte Carlo simulations take longer to set up but provide more robust results to review. These results can help expand management's thinking to cover possibilities they had not previously considered.

When designing the simulations, finance managers should be careful to evaluate the variables in the calculations. For example, when examining the impact of the cost of oil, a finance manager should remain cognizant of the economic changes that rising or falling oil prices will likely exert on the economy. In many areas, the outcomes have many different paths that must be considered.

As the global business environment grows more complex, we believe that the use of Monte Carlo simulations will grow.

Electronic medical records for finance: Advanced technology

The success of U.S. healthcare reform laid out in the recently enacted Patient Protection and Affordable Care Act hinges on the achievement of cost reductions, which the adoption of electronic medical records (EMR) is designed to bring about.

The goal of EMR is straightforward: make each patient's complete health records immediately available to any of his or her medical professionals. This information access should strengthen diagnoses and reduce redundant testing.

Advanced forecasting systems resemble patient medical records because they are linked to multiple information sources that allow a full view of operations and the organizations business environment.

Advanced technology can yield a seamless view of a business. Specific benefits include:

- Easy access to actuals and plans, which generates better visualization
- Operational plans linked to key activities such as marketing events, which are designed to trigger operational drivers (for instance, recruitment of physicians with specialty credentials triggers growth in new service lines)
- Integration of data from internal and external sources, which speeds management's response time
- Greater collaboration because all departments can see the impact their decisions and actions cause on other departments
- The elimination of redundancy and arguments over which department's forecast vision should be used to overcome the tendency to produce "multiple versions of the truth

An advanced forecasting system integrates information from all departments into a single system. It requires common definitions of terms and a consistent view of business. This common view is also shared with the planning, forecasting and reporting functions to facilitate rapid reviews and course corrections when necessary.

Focusing on the key drivers of business operations minimizes excessive detail. The more detailed views typically used in reporting are immediately consolidated into the higher level views needed for driver-based forecasting.

Advanced forecasting technologies provide deep analytical capabilities that finance managers and analysts can use to validate their planning assumptions. They provide modeling tools for the examination of various alternative strategies, such as the scenario planning discussed earlier. They facilitate high levels of participation by accepting contributions from multiple levels. These contributions likely come in diverse formats from different underlying operational systems including ERP, marketing and multiple spreadsheet systems. Advanced technology captures an organization's articulation of its business model and ultimately can enable more rapid responses to changing business conditions based on how information is organized and made available.

Conclusion

For a growing number of companies, the preferred business model is one supported by advanced business forecasting practices, including predictive logic diagrams, advanced measures, scenario planning, Monte Carlo simulations and robust supporting technology.

As Dimensional Fund Advisors CFO and Vice President David Martin explains (see "Scenario Planning in Action"), advanced forecasting practices can help companies leave behind the pain of the traditional budgeting process. That process, Martin notes, is "at best, a complete waste of time. And often it is far worse because it can destroy value for the company."

On the other hand, continuous planning in the form of rolling forecasts and other advanced practices can add significant value. As author and time management expert Alan Lakein emphasizes, "Planning is bringing the future into the present so that you can do something about it now."

About the Beyond Budgeting Round Table

The Beyond Budgeting Round Table (BBRT) is an international shared learning network of member organizations with a common interest in transforming their performance management models to enable sustained, superior performance.

BBRT helps organizations learn from worldwide best practice studies and encourages them to share information, past successes and implementation experiences to move beyond command and control.

About the IBM Cognos Innovation Center for Performance Management

The IBM Cognos Innovation Center was established in North America and Europe to advance the understanding of proven planning and performance management techniques, technologies and practices. The Innovation Center is dedicated to transforming routine performance management practices into "next practices" that help companies:

- Cut costs
- Streamline processes
- Boost productivity
- Enable rapid response to opportunity
- Increase management visibility

Staffed globally by experts in planning, technology and performance and strategy management, the Innovation Center partners with more than 600 IBM Cognos customers, academicians, industry leaders, and others seeking to accelerate adoption, reduce risk and maximize the impact of technology enabled performance management practices.

About IBM Business Analytics

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End Notes

[1] The Beyond Budgeting Round Table (BBRT) is a network of member organizations with a common interest in improving planning, forecasting and control, thereby improving overall performance (http://www.bbrtna.org/).

[2] All references in this paper to Dimensional Fund Advisors and David Martin based on a June 3, 2010 interview with Martin conducted by Steve Player of The Player Group.

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