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FORECASTING AS A COMPETITIVE ADVANTAGE:

Optimizing Business Planning With Advanced Analytics

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REPORT

As the volume of data that organizations produce grows exponentially, more companies are looking for ways to apply predictive and prescriptive analytics to help them uncover insights that would otherwise be locked within vast amounts of transactional and internal data.

Corporate forecasting is evolving to help organizations improve business and financial performance, create value, manage risk, and reduce costs by increasing their understanding of their data, customers, markets and operations.

By generating stronger insights from a greater volume and variety of data, analytics tools can help organizations replace gut instinct with data-driven strategies.

More effective forecasting and a deeper understanding of how markets are likely to evolve can provide competitive advantage by improving a company's agility and its ability to enhance products, target customers more effectively, or gain other operational insights.

In demand planning, for instance, analytics can help companies anticipate the likely effects of variables such as marketing campaigns, market conditions in a given region, price discounts, or other factors to project sales and plan production.

Beyond finance, opportunities arise to analyze human resources (HR), operations, and other areas quickly to answer questions, reduce risk or enhance organizational performance.

Another potential advantage of improved forecasting is a stronger collaboration between finance and business leaders. By generating stronger insights from a greater volume and variety of data, analytics tools can help organizations replace gut instinct with data-driven strategies. This, in turn, can provide finance leaders with more confidence in their figures and business leaders with more confidence in the advice of their finance team.

Although the benefits can be compelling, common challenges implementing predictive and prescriptive analytics include a need to provide quality data, which can be hampered by legacy IT systems, ineffective processes, and a reliance on spreadsheets.

Staffing is another consistent challenge, with qualified data science professionals in short supply and high demand.

Despite these challenges, improving forecasting with advanced analytics can help organizations increase revenue, reduce costs, enhance operations, and minimize risk by providing deeper insights about internal and external factors influencing organizational performance.

With the amount of data that organizations generate expanding consistently, companies need to harness their data streams to make better decisions and develop deeper insights about customers, market conditions, organizational performance and other factors.

In this dynamic environment, corporate forecasting is shifting its emphasis from relying primarily on past data to influence future plans toward applying advanced analytics to help improve business and financial performance by understanding their data, customers, markets and organization more completely.

Developing insights into how markets are likely to evolve can provide a competitive advantage by improving a company's ability to enhance its product offerings and to target customers more effectively.

"There's data everywhere and it's coming at a volume, velocity and variety that is difficult to manage," says Mark Lack, Manager of Strategic Analytics and Business Intelligence at Mueller, Inc., a manufacturer and retailer of metal buildings and roofing products based in Ballinger, Texas.

To achieve these goals, a growing number of companies are working to enhance their forecasting by combining a variety of predictive and prescriptive analytics tools that can provide deeper insights into emerging business trends, identify root causes of factors that influence organizational performance, respond to market competition, and help companies identify and manage risk more effectively.

Predictive analytics apply statistical analysis, predictive modeling, data modeling, real-time scoring, and machine learning to discover trends in structured and unstructured data (generated within an organization and from outside sources) to forecast and rank likely events and their outcomes. Prescriptive analytics helps organizations make better decisions by ranking and optimizing trade-offs between business goals, such as costs or customer growth, and suggesting recommended actions.

Together, these tools can support more detailed and timely discussions of organizational performance, marketplace trends and other factors to enhance the organization's decision-making capabilities while providing:

- Deeper insight into customer behavior within markets and segments;
- A stronger ability to identify and meet business challenges;
- Reduced operating costs; and
- More effective risk management.

"We've always thought forecasts were somewhat predictive, but there's so much more data within the organization and information on the periphery that we need to be able to use to help us make predictions," says Jim Collins, Financial Performance Management Strategy Executive within the Business Analytics Group at IBM.

"From a finance standpoint, we are very good at the reactive piece of the business and being able to make changes when we're talking about the past and our performance. Now, from a strategy-setting standpoint, to be competitive — or even to continue to do business — you have to be more aware of the predictive influences on your business."

Scenario modeling, for example, helps companies to explore thousands of combinations of factors to analyze and rank potential outcomes, and to identify the factors with the greatest effect on business outcomes.

"If you look at your business from a predictive standpoint, 'what-if' analysis allows you to look at your growth strategies, whether it's going to be product profitability, customer profitability, adding or deleting product lines, or mergers and acquisitions," Collins says. "Another aspect that is taking hold is companies going outside of their industry to grow or face new competitors

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Effective analytics tools help business leaders perform sophisticated analysis and statistical modeling that factor in multiple independent variables based on an organization's historic performance and publicly available data. This can include economic conditions in given markets, competitive activity, traffic and weather patterns, contact center trends, social media sentiment, and an almost endless array of other public and private data that can provide meaningful signals.

"The indicators that companies use vary from company to company, and they're based on their industry and preferences," says Collins. "Have we had the right inventory at the right time? Have we been able to staff properly? Have we been able to maintain profitability from these varying areas in a growth pattern? From a performance management perspective, companies are looking at increasing revenue, decreasing cost and increasing profitability, and managing risk."

For example, predictive analytics can help companies analyze accounts receivable to create profiles that rank customers based on the likelihood of them paying invoices promptly. This, in turn, allows the company to customize its credit terms and communications plans to increase the efficiency of its collection efforts.

Similarly, companies can identify patterns that suggest which customers are more likely to leave, and quantify the likely effects on revenue and profit. This information is valuable in determining which customer investments are most likely to increase customer retention and growth.

In other examples, companies are optimizing inventory levels by applying point-of-sale data to adjust purchases from suppliers. This may help reduce the risk of ordering too much merchandise or having to expedite the shipment of popular items to avoid running out of stock.

Organizations can increase their agility by embracing analytics to gain a deeper understanding of emerging market trends. These tools provide the ability to spot opportunities earlier and to detect early warning signs of potentially negative developments.

The key performance indicators (KPIs) that companies use to evaluate how well they are doing vary by organization and industry practice. Companies are increasingly using analytics to understand reports and metrics including:
• Income statements and balance sheets
• Cash flow statements
• Competitive analysis
• Strategic investment analysis
• Cost analysis
• Profitability margin analysis
• Working capital and cash flow analysis
• Pricing analysis

Organizations are using analytics to better understand and examine metrics such as budgeted revenue and spending versus actual results. Some also examine HR metrics, such as employee turnover and retention rates, as well as staffing ratios and trends.

"We set out, when we started, to look at our systems and move our business from a spreadsheet environment to an automated, integrated platform," says David Alarcon, Senior Director of Finance for International Medical Corps, which provides humanitarian and medical services in areas affected by war or natural disaster. "The whole idea was that you drive your car forward, not looking backwards through your rearview mirror. And that's really what we've set out to change."

Predictive analytics provide insights into supply chain metrics such as inventory turnover, stock values, procurement trends, warehouse performance, quality control, and compliance.

"We look at things like business profitability and individual location profitability, but the biggest driver of everything we do is sales revenue, because that dictates our corporate goals for profitability, margin and expenses," says Mueller's Lack.

To help make data easier to interpret, analytics solutions typically include visualization tools, such as performance dashboards, that provide graphical interpretations of data signals, as well as the ability to drill into data sets to obtain additional details. This visual capability enhances the ability of business executives — including those without statistical backgrounds — to understand easily what the data is telling them and to make more effective organizational decisions in less time.

"We connect mostly with stories and images," Lack says. "Data in raw form is not something that people feel comfortable analyzing. Our analytics team takes the analysis and makes the data much easier for the organization to digest.

"We have situations where advanced analytics, taking a deeper dive into vast amounts of data, helps us answer questions to a much higher confidence level than we could by looking at a few pages of reports that summarize information."

The growing use of analytics to enhance forecasting represents the latest development in the increasing recognition that an organization's data has evolved from a byproduct of its interactions with customers and stakeholders into a powerful source of organizational value.

"Data has become an asset to us," says Alarcon. "The design of how we've connected our systems and the data that is running through our software offers immense value in the information we have available to make management decisions and improve the way that we do business."

Alarcon says analytics tools help International Medical Corps improve efficiency by allowing them to make decisions in less time.

"I'm now working with our global supply team in using analytics to support decisions instead of making assumptions and going through tons and tons of data manually," Alarcon says. "Now, we're able to do it quickly and address bottlenecks much sooner."

As companies apply analytics to their forecasting process, they are able to factor in the likely effects of a variety of variables, such as marketing campaigns, market conditions in a given region, price discounts, and other factors, to project sales and plan production.

Donald Neumann, PhD, Demand Manager at Brazilian cosmetics manufacturer and retailer Grupo Boticário, says his company models anticipated buying behavior at its franchises as well as in its direct-to-consumer sales.

"I take all the inputs of demand drivers to create a plan for the next 12 months, and we make suggestions for our franchisees about how much they should buy, taking into account their inventory levels and anticipated demand," Neumann says. "We send our demand plans to operations and finance, and they forecast our financial KPIs. We're able to integrate our demand plan with our financial plan more effectively."

Neumann says Grupo Boticário's forecasts are influenced by factors such as fashion trends and economic conditions in each of its franchisees' markets.

"We understood that if we can grasp insights from our market faster than our competitors, we can also act much faster because we are a franchising network," Neumann says. "We understood that forecasting processes can generate competitive advantage.

"Before this project, we worked only with sell-in data, meaning how much we sell to the franchisees. Now we are working with sell-out data, meaning how much our franchises are going to sell to the markets, and that was a very big change. The value we get from our demand plan is totally different."

Lack says Mueller coordinates forecasts at the corporate level and with its 40 retail locations to provide realistic expectations of future sales. Mueller's model examines non-financial metrics to predict revenue by location based on changes in the selected metrics.

"[The business unit leaders aren't] professional forecasters, but they are close to the ground," Lack says. "They understand customers and the movements of their markets, so they can give a good forecast.

"What we then want to do is validate their forecast through statistics. If we can validate that, what'll happen is we can either work with what they've given us, or it could give us new insight into the direction that it's headed. We can look at these numbers and see what they believe is going to happen, but if the numbers tell us otherwise, then we have a conversation about what the predictive models have said," Lack adds.

And as companies become more proficient with predictive and prescriptive analytics tools, the need to interpret financial and operational data faster becomes more acute. As data comes in, companies are moving closer to reporting and reacting to data in real time.

"We used to see the raw data and we would spend a lot of time trying to find meaningful information out of it," says Ali Arshad, Manager of Data Analytics at International Medical Corps. "But now, it's amazing how we are reducing the time for our teams to see that data and make decisions in a faster way."

"Examining or analyzing your business based upon forecast information that was created five, six, or eight months prior to the actual data that you're looking at may not give you an accurate picture of your performance," says IBM's Collins. "Rolling forecasts utilizing current internal and external data will provide a much better basis for current performance assessment. The ability to react quickly to current market changes and events is necessary in this ever-changing business environment, providing efficiencies throughout the organization, and a half a percentage point improvement in gross margin because you've gotten more efficient can be pretty significant."

"What's working for us today is the ability to pick up real-time and near real-time data, which has drastically improved our ability to start to identify the root causes of some of the challenges that we face," says International Medical Corps' Alarcon. "I think the most important part of what's working is that we're able to address our problems and our bottlenecks precisely.

"In finance, our budgets and spending vary with our revenue. It's not just looking today at expenditures — it's how we're looking into the future. When we need information right away, we have it available at our fingertips via the analytics that we've built. We use the data for finance, HR, the travel realm, and even security. We use it every day."

As companies become more proficient in understanding and applying analytics tools to their data, opportunities arise to analyze information quickly in non-financial realms to answer questions, reduce risk or enhance organizational performance.

At International Medical Corps, analytics helps the organization protect employees traveling to often-dangerous parts of the world.

"We're tied into the Sabre [travel reservation] system, and through visualization, we keep track of all travelers and what locations have the most travelers, and we tie that data into our security systems so we can keep track of which locations are our threat locations," says Alarcon. "That means that they're high-risk locations that our staff travels to."

Lack says Mueller resolved a long-standing issue in which the company experienced higher reports of damaged items among custom-ordered roofing materials that the company then replaced at no charge. The company believed the damage was caused by improper packing and shipping of delicate materials until it examined sales and returns data with analytics tools.

"I looked over three million rows of sales data over the prior three years and then analyzed that against the number of damaged pieces of that material class. By the end of the day, I understood that the problem wasn't material being damaged; it was that the

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majority of the damaged pieces we replaced had been ordered incorrectly. What we basically were doing was measuring once, cutting twice, instead of measuring twice, cutting once.

"Now this goes from being a packaging issue to being a sales process issue, and we talk about retraining, not repackaging. Without the analytics tools, we couldn't have uncovered that. We retrained our sales team and, lo and behold, the damage goes down. If you begin with assumptions, [it's] because we have our own biases, we have our own beliefs. Data has no biases."

Another potential advantage of improved forecasting is stronger collaboration between finance and business leaders. By providing more data and generating strong insights, analytics tools can supplement the gut instinct that has long been foundational in making operational decisions.

IBM's Collins says finance and business leaders need to collaborate, discussing ways new types of information can help them better understand business units, competitors and markets.

"The business users are the ones that have their thumb on the pulse of the business," says Collins. "They're the ones that are using the data, or need access to the data, to do their jobs and to enhance what they're doing. There's nothing better than that collaboration because you're all working toward the same goal, whether that's to either increase your revenue or increase profitability or manage risks. Linking financial and operational plans is a key to success."

Alarcon of International Medical Corps says collaboration tends to become self-reinforcing because, as executives obtain and apply more data, their appetites for additional data increase.

"As our teams are seeing their data coming through, they're becoming smarter in the way that they want the data, and they keep asking for more and more," he says. "It also becomes a challenge, like a wheel that keeps turning in circles. So, even though it's a challenge, it's a good challenge because our workforces are becoming educated on the use of analytics."

"Somebody sees that you're getting information much more quickly and they say, 'How do you get that so much faster? What are you doing?'" says Collins. "It's that old saying, 'Work smarter, not harder,' and the application of analytics to the business certainly provides that benefit."

Capitalizing on the benefits of that collaboration, however, requires a degree of communication between data professionals and business leaders so they understand each other's terminology, as well as the technology's capabilities.

"Our planners today need to make sense of the plan in order to explain it," says Neumann. "If a data scientist goes to a meeting, he's going to start talking about standard deviations and neural

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networks, and if that doesn't work, you have to improve your people skills such that they can make sense of the number.

"If you don't get your models and your insights connected with the business decision-making process, then you're isolated."

Collins says effective collaboration starts with understanding the information business units are using to monitor and improve performance, and to make sure the information and reports being produced reflect actual needs.

"What we're really looking at is, 'What information are you using today? Where is it going? How often is it being used? Who is using it? Is it being used?' You start assessing those pieces and processes, then you start looking at, 'Are there pieces of information that I can convert to knowledge that would help me meet my business objectives?'"

Analytics can also lead to an improved understanding of a business for compliance purposes.

"There's the compliance issue of making sure that we have everything together," says Lack. "We want to be able to use data to handle those things. There could be non-financial numbers that could drive what decisions we need to make."

"We were thinking of modifying a procedure in HR, and we wanted to see what the impact would be," says Alarcon of International Medical Corps. "We ran numbers on the amount of times it took to complete a certain procedure, then we analyzed, over two years, how many times those things happened. We then came up with the amount of resources needed to modify that process and cut costs. So, we're starting now also to develop cost-cutting measures via the analytics."

While the potential benefits are compelling, most organizations face a variety of challenges in implementing predictive and prescriptive analytics. Being able to generate insights effectively starts with quality data, which can be elusive in companies with an array of legacy IT systems that don't share information, not to mention a lack of process standardization and a reliance on spreadsheets on local and shared drives.

"A lot of companies we talk to are managing multibillion dollar businesses on spreadsheets," says Collins. "That's pretty scary when you think about the lack of collaboration, errors and omissions, version control, and things of that nature that can happen with spreadsheets.

"Someone could press a space bar, and all of a sudden you have a text reference in a cell that you need numbers in. That blows your whole roll-up, and you're looking for four hours trying to figure out the problem. That is just an example of the kind of things that happen to create inefficiencies."

"Some of our processes are manual data entry, and that causes a lot of issues when we do analytics," says International Medical Corps' Arshad. "We are in a constant process of cleansing our data. There's an ongoing process, and part of it involves training our users so that when they enter the manual data, they enter it correctly so we don't have any issues and we don't have to spend time cleansing the data."

Lack says a common data challenge results from various parts of the organization using their own metrics based on local conditions and performance.

"You have a corporate level of data that you try to manage within the governance, but then there's local data that people use to make their own decisions," he adds. "That data can be important to the entire organization, so it's breaking from the silos to gain access to what's on somebody's desktop spreadsheet and bring it across the organization, because that type of clarity is important for that part of the organization, but it could be important to everybody."

Collins says companies exploring analytics may also have to overcome cultural resistance to change, or a need among company leaders to enhance current processes.

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> *Financial Performance Management Strategy Executive, IBM*

"One of the most critical things is to have the business users involved from the get-go, starting with the scoping," Collins says. "Whatever you're going to do from an implementation standpoint, the business users become a key to success. Those dreaded words, 'That's the way we've always done it,' become a real hindrance in businesses.

"The application of analytics could be anywhere in the enterprise," Collins adds. "It could be finance, marketing, supply chain, etc. The interaction with IT has to be there. If you don't have that, you're doomed for failure. You have to have that handshake with IT. Proper scoping of the project will help all participants understand that there are a lot of things that the business users are going to be able to do that won't need IT intervention, and that's going to free the IT folks up to do other important things within their organization."

Neumann says financial leaders must help business units understand how the modeling effort will help them make more effective decisions to gain acceptance and cooperation.

And perhaps the biggest challenge is finding qualified data scientists. As analytics tools gain corporate acceptance, demand for data scientists exceeds the supply and data professionals command a premium for their expertise.

"Data scientists are, first, very expensive and, secondly, many people call themselves data scientists but they are not really data scientists," Neumann says. "When you are trying to find people, you need to find a good combination of people who can work well with IT and understand databases, but they also need to talk business. They need to be able to understand and explain what the company wants for its business needs, not only hard data findings.

Outsourcing can provide a way for companies to obtain access to data science capabilities quickly, but Neumann says he prefers to find people with data expertise and bring them up to speed on business needs.

"I was very lucky because I found two very good data scientists who had never worked with demand forecasting, so we trained them and developed this knowledge and insight in-house," he says. "I've worked with modeling myself and I teach linear programming and modeling techniques at a university, and I believe that if you buy the models, you get models but you don't get knowledge. It was very important for me to have people in-house to develop and understand knowledge about our demand drivers inside our company and not inside a consulting firm."

Collins says that as a company begins an analytics implementation initiative, it's important also to review its processes and data needs to avoid automating an inefficient process or wasting time analyzing data in which few executives are interested.

"You have to ask if there are things you're doing, or reports you're generating, that don't add value," Collins says. "You have to assess your processes. Just because you can count something doesn't mean you should. There's a lot of information available, especially today when we have so much more data than we've ever had before. It becomes a real necessity to start measuring what matters rather than just saying, 'Let's measure everything.'"

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