WHITE PAPER

The Business Value of Predictive Analytics

Sponsored by: IBM SPSS

Dan Vesset   Henry D. Morris
June 2011

EXECUTIVE SUMMARY

An asset management firm is able to increase its marketing offer acceptance rate by 300%, an insurance company is able to identify fraudulent claims 30 days faster than before, a manufacturer is able to anticipate equipment maintenance issues, a bank is able to identify 50% of fraud cases within the first hour, and a communications company is able to increase customer satisfaction as measured by net promoter score by 53%.

These are just a few examples of the use of predictive analytics at organizations evaluated by IDC. As markets shift to what we have defined as "the intelligent economy," or the convergence of intelligent devices, social networking, pervasive broadband networking, and analytics, there is a significant decrease in the ability of managers to rely effectively only on experience or intuition to make decisions. The old cause-and-effect mental models are becoming less relevant, while the demand to respond faster and with greater insight to ongoing internal and external events based on facts is increasing.

Analytic techniques can be broadly segmented into those focused on information access and presentation and those focused on predictive analytics related to specific decisions. These techniques are complementary, and in this new intelligent economy, it is not only access to information but the ability to analyze and act upon it that create competitive advantage in commercial transactions, enable sustainable management of communities, and promote appropriate distribution of social, healthcare, and educational services.

Predictive analytics may conjure up thoughts of quantitative analysts pondering over endless algorithms somewhere in the bowels of your company. Or it may trigger some distant memories from a class on statistics. The reality is that most managers (and staff) are not fully comfortable with the process of developing predictive models on their own — nor should they be. Deep knowledge in data mining and statistical analysis is not a widely available commodity. Yet an increasing number of managers in a growing number of organizations are acknowledging that predictive analytics can play an important role in enabling better decision making to support better interaction with customers, optimization of operations, and anticipation and mitigation of risk and fraud.

Not only are these individuals and organizations acknowledging the potential value of predictive analytics, but a growing number are also doing something about it, including establishing or growing their internal analytics teams, acquiring appropriate technology (some of which has become increasingly business user friendly),

reassessing information collection and integration processes, and evaluating needs for outsourcing some predictive analytics processes.

These investments have been shown to produce outsized returns in the form of business process enhancements across the organization. IDC research shows that:

☑ The return on investment (ROI) of business analytics solutions that incorporate predictive analytics is about 250%, significantly higher than the 89% ROI of projects focused only on information access and internal productivity gains.

☑ Benefits of predictive analytics projects are sustained over long periods of time, and those that rely more on analytics tend to be more competitive.

☑ Predictive analytics projects result in many intangible or difficult to quantify benefits that give further impetus to investment in these solutions.

☑ Investment in predictive analytics continues at a healthy pace, even in tough economic times. For example, over the past 10 years, the compound annual growth rate (CAGR) of the IDC-tracked $1.6 billion worldwide advanced analytics software market has been 7%, compared with a 3% CAGR for the overall IT market during the same period.

SITUATION OVERVIEW

Eight years ago, IDC conducted a market research study involving an in-depth evaluation of the ROI of business analytics solutions at 43 organizations in North America and Western Europe.

Since that time, IDC has continued to evaluate the benefits of business analytics overall and predictive analytics in particular. Our latest research, conducted in 2011, extended the original research with additional in-depth interviews and a survey of 200 United States–based organizations.

Predictive and Non-Predictive Analytics: Different But Complementary

A variety of technologies form the basis for business analytics solutions. But not all analytics are predictive. At their core, predictive analytics are all about identifying and improving the probability or likelihood of an event, action, or behavior. The software to support and automate predictive analytics includes tools for statistical analysis, and data and text mining. We define the two types of projects as follows:

At their core, predictive analytics are all about identifying and improving the probability or likelihood of an event, action, or behavior.

☑ Predictive business analytics projects utilize tools that IDC classifies as advanced analytics (i.e., tools that incorporate technologies that apply mathematically oriented techniques such as neural networks, rule induction, and clustering to discover relationships in the data and make predictions). Alternatively, predictive projects implement packaged analytic applications that incorporate predictive technologies, such as a fraud detection application.

☑ Non-predictive business analytics projects utilize business intelligence tools that IDC classifies as end-user query, reporting, and analysis. Alternatively, non-predictive projects implemented packaged analytic applications that incorporated these technologies.

In our analysis, projects that incorporated both predictive and non-predictive technologies were classified as "predictive." In these cases, technologies such as business intelligence for query, reporting, and analysis support the overall predictive analytics efforts and are therefore frequently used in conjunction with predictive analytics technologies.

The ROI of Predictive Analytics

Eight years is a very long time in the IT industry. Many changes have occurred during this time to system performance and software capabilities as well as to general awareness of the market of the value of business analytics in general and predictive analytics in particular. The following points highlight some of the key changes in IDC research results over this time period as well as other overall highlights of benefits from predictive analytics projects:

☑ Based on IDC research, the median ROI of predictive analytics projects is close to three times higher than that of non-predictive projects.

The median ROI of predictive analytics projects is 250%, which represents an increase from the 145% average ROI from IDC's 2003 study. Other key differences over the past eight years in projects involving predictive analytics were:

> The median ROI of predictive analytics projects is 250%.

❑ **The volume and variety of data being analyzed.** For example, an increasing number of organizations are improving their predictive models by evaluating and training them on combined sets of structured and semi-structured data with unstructured content.

❑ **The higher priority and imperative of predictive analytics among organizations' overall initiatives.** Predictive analytics has certainly become a topic of many more conversations and gained a new respect among "non-quants."

☑ Many of the benefits of predictive analytics projects are ancillary to the directly quantifiable benefits that can be captured through a formal ROI calculation.

☑ Major benefits of business analytics projects that employed predictive analytics center on business process enhancement, especially improving the quality of operational decisions. This contrasts with the primary benefit of non-predictive analytics projects, which focus on productivity improvement. Yet, in most cases, predictive and non-predictive analytics are deployed together as part of a broader business analytics solution.

In measuring ROI, IDC identified and measured two types of benefits — process enhancement and productivity improvement. In our research, we defined business

process enhancement as the ability to improve or change how the organization operates (e.g., created new business processes and/or introduced new products or services, better customer segmentation, and/or better accuracy in detecting fraud). In this case, the results of deploying analytics resulted in driving more revenue (e.g., attracting more sales in a marketing campaign) or recovering costs (e.g., identifying fraud and acting on this to reduce payments that otherwise would have been made). Projects employing predictive analytics typically showed more of these benefits.

Productivity gain was defined as the ability to achieve efficiency savings due to the reduced amount of time, effort, or people required for particular tasks (e.g., faster data collection, faster report development). In this case, the primary benefit was the ability to save labor costs. For example, a project using improved process for reporting (possibly with more automated data integration) results in less labor (e.g., fewer people required for the financial closing process that is reporting oriented). We can measure the difference in person-hours for completing the process, before the project was implemented and afterward. However, productivity gains often result in a "soft" benefit — meaning that unless you have decreased your personnel, these people are still on the payroll doing other tasks. So the firm may not have reduced its costs when all is considered.

Predictive Analytics Projects

Predictive analytics have applicability to a wide range of business processes. In one example, an asset management firm used predictive analytics to improve marketing efforts. The company wanted to change from a mass marketing approach where every prospect received the same offer to an approach that enabled personalization. The company used predictive analytics to predict the likelihood of a prospective customer accepting an offer. After deployment of predictive analytics, the acceptance rate increased by 300%, translating into several hundred million additional dollars under management, of which this firm receives a management fee. As one of the vice presidents interviewed by IDC said, "We experienced a shift from product marketing to customer marketing."

Predictive analytics have applicability to a wide range of business processes.

The additional revenue created what could be viewed as an annuity stream of net-new revenue. In addition, one of the benefits was a substantial decrease in the number of direct mail pieces sent by the company. IDC estimates that the company achieved an ROI of 374% on this particular project, which included an initial investment of about $875,000 in services, staff, and technology. By reassigning existing staff, the company did not create a new IT or data management team to support the predictive analytics solutions. Nor did it hire new market staff. Instead it relied on an outside consulting firm to execute on the newly available insight. Although the company's management estimates that 98% of benefits were business process enhancement rather than IT cost savings or productivity gains, the company did complement predictive analytics with a rules engine and query and reporting software.

In another case, an auto insurance company used the predictive analytics solution as a basis to reengineer its claims department. The ability to identify and score initial claims using predictive analytics software allowed the company to shift first notice of loss processes from the call center to first line claim adjusters. As a result, 22% of

initial claims were taken out of field operations — a costly, labor-intensive process requiring more experienced adjusters to be sent out to evaluate property damage. The company did create a new analytics team that added labor costs, but these quantitative analysts are now supporting the rest of the adjusters.

The company was also able to improve its fraud detection and prevention practices. The predictive analytics solution has been utilized to continually build more robust rules for fraud detection, which has resulted in a drop in false positives for fraud instances and better leads for fraud investigators. As a result, it now takes 24 hours to 10 days (depending on the case) rather than the previous average of 40 days to move a claim to the fraud investigation team. The ability to recognize fraud quicker has improved margins, and the company believes that in some cases it has also deterred fraud.

There were several other benefits that were either impossible to quantify or had not yet produced enough traceable information to be included in a formal ROI calculation. Nevertheless these benefits provide or are expected to provide the company with valuable returns on its investment:

☑ The internal reorganization resulted in more specialized work groups. For example, the company set up a group of adjusters that focus on organized fraud by criminal groups, which takes longer to delve into. Deploying predictive analytics has had the added benefit of creating new career paths for existing (and new) employees, which in turn improved employee satisfaction. This was an important objective for the company; as a senior VP of the company said, "On the one hand, these new solutions provided us with more automation. On the other hand, people are now dealing with more exceptions — a higher value-added and more satisfying work."

☑ Data into the claims system now comes from an expanded number of internal and external sources. For example, the company uses externally sourced automobile crash data to evaluate the probability of a specific type of damage. Using this new capability, analysts can calculate the probability of supplementary or hidden damage. If this probability is high and fraud probability is low, the company does not send an adjuster out to review the claim, which provides savings from the new analytics-enabled business process.

☑ Predictive analytics have been extended into a net-new area of focus on medical fraud, which has helped in identifying particular clinics and providers that may have patterns that represent fraud. These efforts have combined to decrease litigation and external attorney costs by about $2 million a year.

IDC estimates the original focus on fraud detection and prevention and claims processing has resulted in an approximate 400% ROI. However, since then the company has taken further steps to also focus on customer service, customer retention, and sales. For example, there is currently focus on improving the net promoter scores by assessing the likelihood of a customer to recommend the insurance company to a friend or family member.

Deploying predictive analytics has had the added benefit of creating new career paths for existing (and new) employees, which in turn improved employee satisfaction.

This customer case is representative of another phenomenon that identifies most competitive or leading organizations and their use of predictive analytics. That is the cross-departmental learning and incremental expansion of the use of predictive analytics throughout the organization. For example, applying predictive analytics to fraud detection and prevention can also inform marketing processes — a new service should probably not be marketed to someone who has been identified as being involved in fraudulent activity.

In many cases, analysts working on predictive analytics in silos are in fact addressing very similar issues such as scoring a customer based on risk factors and likelihood to purchase. Best practices call for analysts to share their analytic techniques as well as results of the analysis to leverage such expertise across the organization.

This does not mean that an enterprisewide predictive analytics initiative needs to be deployed at once. Another best practice is to focus on incremental project execution, which enables showing quick returns from relatively small investments or cutting losses quickly when results are not favorable. However, each incremental project should build upon and learn from previous projects under a broader business analytics strategy.

The two examples described represent a range of business processes (e.g., fraud detection, marketing, sales, customer service, and operational processes) that can benefit from predictive analytics. These are not atypical cases. In fact, in the survey IDC conducted of 200 organizations that were utilizing predictive analytics, we found a broad range of business processes where predictive analytics had made a positive impact. (For more information on the survey methodology, see the Appendix section of this paper.)

Typically, predictive analytics are referenced in the context of business issues such as fraud detection, customer churn prevention, and audience target marketing. However, the reality is that predictive analytics are being applied across all major business processes. However, the frequency of projects differs (as shown in Figure 1), and given limited resources, focus should be placed on key processes that have the potential to produce the highest impact. These are usually found within the core operational process of your organization, depending on the industry in which you work. In insurance, that could be claims processing; in retail, it could be pricing optimization; in banking, it could be fraud detection; and in telecommunications, it could be customer churn prevention.

Figure 1 depicts the business processes as well as the type of primary benefit derived from the application of predictive analytics as reported by the survey participants. For each of these processes, business process enhancements trumped productivity improvements as the primary change that resulted from the use of predictive analytics. The results ranged from the sales process, where 75% of survey participants described the primary change resulting from the use of predictive analytics as business process enhancements, to the finance process, where the same result was 51%. Although these results show the disparity in types of benefits, they also highlight the fact that in most cases there are both business process enhancements and productivity gains.

Best practices call for analysts to share their analytic techniques as well as results of the analysis to leverage such expertise across the organization.

FIGURE 1

Application and Benefit Type of Predictive Analytics by Business Process

Q. For each of the business process areas below, how would you describe the primary change that resulted from the use of predictive analytics technologies and processes?
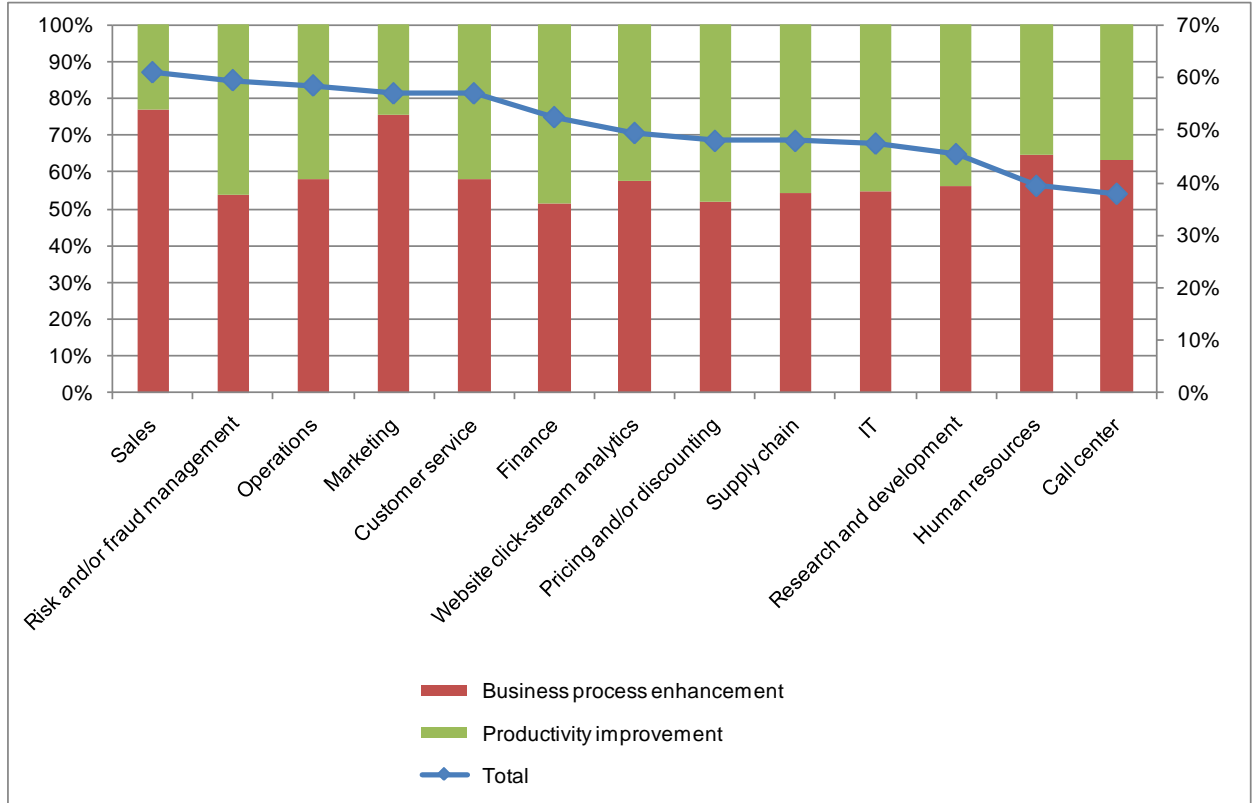
n = 200

Note: Data excludes "other" and "none of the above" responses.

Source: IDC's *Predictive Analytics Survey,* March 2011

Scope of Benefits

Popular descriptions of predictive analytics often depict this activity in terms of uncovering an invaluable nugget of information — the needle in the haystack. The reality is that while there are special projects where analysts are tasked with uncovering information for a rare question, in 61% of the cases surveyed by IDC, organizations derive ongoing benefits from predictive analytics. Furthermore, the largest group of respondents (39%) indicated that these are large, ongoing benefits (see Figure 2).

From our interviews, we found many cases that resulted in substantial profitability improvements from the ongoing application of predictive analytics. One of the VP-level interviewees summarized his view as follows: "With predictive analytics, if you're even a little more right, the return is almost infinite."

"With predictive analytics, if you're even a little more right, the return is almost infinite."
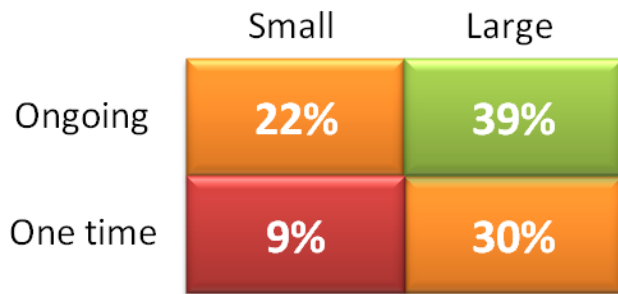
RECOMMENDATIONS

Deployment of predictive analytics has the potential to produce significant return on investment. However, predictive analytics projects need to be viewed as a combination of people, processes, and technology. There are a number of factors that organizations should take into consideration when launching predictive analytics projects. The best practices discussed in the sections that follow should serve as a guide in managing predictive analytic projects and in making predictive analytics more pervasively available within the organization.

Develop a Predictive Analytics Strategy

To succeed with predictive analytics, organizations should develop a strategy for related staffing, technology, and processes. Although most predictive analytics projects are focused on improving specific business processes, an overall strategy enables more optimized allocation of predictive analytics and supporting resources over time.

When analyzing responses to IDC's predictive analytics survey, we categorized organizations into two groups based on their response to the question about their organization's competitiveness within their industry. This often-used technique in market research enabled us to compare results from the most competitive organizations and the rest of the organizations.

The results show that the most competitive organizations are 23% more likely than the rest of organizations to have an enterprisewide predictive analytics strategy (as opposed to departmental strategy). However, operationally, predictive analytics projects should be executed at the project level that aligns with a single department or even a

specific business process. It's best to tackle processes where there are repeatable, operational decisions that over time have a major impact on bottom-line results.

This means that the involvement of middle (non-executive) management is important for the success of predictive analytics projects. To be clear, executive management involvement is important from the perspective of overall funding and setting the enterprisewide strategy, but when respondents were asked how involved non-executive managers are in predictive analytics projects, the difference between the most competitive organizations and the rest was 189% versus 25% for executive management involvement.

These line-of-business managers have detailed business process expertise that drives predictive analytics requirements. It is usually not the executives or the IT groups but the line-of-business groups that identify the need for predictive analytics. It is these line-of-business groups that need the support of quantitative analysts with expertise in predictive analytics.

Staff and Services

The availability of appropriate predictive analytics human resources is both an enabler and an inhibitor of benefits from predictive analytics. On the one hand, these expert analysts with statistics, data mining, and decision management backgrounds can produce results that have a high impact on the bottom line of their organizations. On the other hand, one of the key inhibitors of more pervasive use of predictive analytics is the relatively small number of these experts. As a result, organizations need to consider best practices for managing these limited analytic human resources as well as finding software that enables business analysts and managers to employ some predictive analytics on their own.

One of the best practices we found through our research is to establish a centralized predictive analytics group — what could be called a predictive analytics competency center. In our survey, we found that the most competitive organizations are 56% more likely than the rest of organizations to have a centralized predictive analytics group. This organizational structure aligns with that of having an organizationwide predictive analytics strategy. It also provides organizations with more agility to deploy this centralized analytics group and all the expertise within it to individual projects across the organization as needed. That said, over half (55%) of all organizations have both a separate centralized predictive analytics group and staff distributed throughout the organization. In other words, establishing a predictive analytics competency center is important but can be supplemented with additional, distributed staff.

Finally, we found through numerous interviews that the best or rather most impactful predictive analytics analysts have both analytics and business process expertise. The statistics prowess is only part of the equation for success. Quantitative analysts need to understand the context of the data they are analyzing, the pain points of the line-of-business group they are supporting, and the downstream use of the output of their analysis.

The ability to communicate the results of the analysis effectively to the line-of-business staff is what separates the best analysts from the rest. The most competitive

organizations (130% more than the rest of the organizations) indicate that the output of predictive analytics is extremely influential to the way employees perform their jobs on a day-to-day basis. In cases where organizations don't have enough internal predictive analytics staff, they should consider outsourcing this function. Outsourced analytics, or analytics as a service, where an external firm is provided access to the relevant data and performs the analysis (rather than only providing the technology), is a growing market.

Technology

Predictive analytics technology is important. It includes tools for statistical analysis and data or text mining but is also dependent on or related to software for data integration, cleansing, warehousing, presentation, embedding into operational systems, and rules engines.

In our research, we found that the difference in median ROI across predictive and non-predictive cases should not imply that predictive analytics is appropriate for all projects. The choice of technology depends on the scope and complexity of the problem to be addressed. Usually both predictive analytics and business intelligence technology are used to provide the complete decision support or decision automation solution. 73% of the survey respondents indicated that employees who have access to predictive analytics functionality also have access to such business intelligence technology as dashboards and reporting and multidimensional analysis tools.

Among other factors, predictive analytics technology influences the speed of response of analysts to business end-user requests — a key variable of more pervasive use of predictive analytics. The most competitive organizations were 25% more likely to be extremely satisfied with the speed of response of analytics staff to business employees' requests.

But this technology can be fully leveraged only if business users are explicitly shown the potential of the technology (and analytic methods). As one of our interviewees mentioned, "One of the biggest challenges for my team was to get internal groups to understand what predictive analytics is — that this will change the game." At this company, the lever of influence used internally was to speak the language of business users to communicate the potential benefits and to show proof of concepts that highlighted fast deployments and fast wins for the business users.

IBM SPSS PREDICTIVE ANALYTICS

One of the leading predictive analytics technology providers in the market today is IBM with its SPSS software product line. The functionality of the IBM SPSS portfolio includes software for data collection, statistical analysis, data modeling, and decision management. With the ability to support both data and text analytics, IBM SPSS Predictive Analytics technology enables quantitative analysts to support fact-based decision-making processes of all decision makers in their organization. IDC research has found that the resulting improved analytical orientation of the organization is a leading indicator of competitiveness.

CHALLENGES AND OPPORTUNITIES

The opportunities to apply predictive analytics to improve operational and tactical decision making are vast. In an era of what IDC describes as the "intelligent economy," the need to make better decisions faster based on ever-growing volumes of multistructured data lies at the cornerstone of the creation of competitive advantage. IBM with its SPSS solutions and complementary technology solutions in its business analytics and optimization portfolio (e.g., Cognos, Netezza, Unica, Coremetrics, Ilog, and others) as well as related professional services is well positioned to take advantage of customer demand for both standalone and application-embedded predictive analytics technology.

However, as in all markets, IBM is not the only vendor and has to contend with competitors. More importantly, there continue to be inhibitors in the adoption of predictive analytics. Many of these inhibitors relate to internal processes, organizational behavior, and analytics expertise. Many organizations are faced with issues such as unwillingness to share results across the company, lack of staff with predictive analytics expertise, perceived complexity of predictive analytics, unwillingness to tackle related process reengineering work, and lack of a clear understanding of the business value.

As the adoption of predictive analytics expands, knowledge sharing among practitioners and a growing body of best practices, case studies, and research materials by market research and advisory firms such as IDC, vendors such as IBM, and academic institutions are continuing to alleviate some of these issues.

CONCLUSION

A growing body of market research shows that predictive analytics can impact the profitability and competitiveness of an organization. This and previous IDC studies demonstrate that:

- ☑ Predictive analytics projects show a higher ROI than projects using non-predictive business intelligence technologies alone.

- ☑ The type of benefit accruing to predictive analytics projects is different. It is focused on process enhancement, and it tends to be more durable to an organization.

- ☑ The business value of predictive analytics is maximized when analysts with the relevant expertise translate the output of their work into easily consumable and actionable input for their line-of-business colleagues. This process usually involves complementary business intelligence tools or embedding predictive analytics in operational applications.

APPENDIX

Survey Methodology

This IDC White Paper is based on primary research including five in-depth customer interviews about customers' use of predictive analytics. Due to the nature of the information shared with IDC, the organizations requested to remain anonymous. Throughout this paper, IDC identifies the participants only by industry affiliation. In addition, in March 2011, IDC conducted a survey of 200 United States–based organizations representing 18 industries. Of the organizations surveyed, 27% had 100–999 employees, 45% had 1,000–4,999 employees, 8% had 5,000–9,999 employees, and 20% had 10,000 or more employees. All the survey respondents were involved in some capacity with predictive analytics. 18% of respondents were from IT, 30% were from executive management, and 53% were from line-of-business functional areas. The survey participants were sourced by IDG Research Services group, which also executed the survey. The data was analyzed by IDC analysts.

Copyright Notice