

Advanced Analytics: End User Experiences and Future Plans

Fern Halper, Ph.D



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Table of Contents

Table of Contents	2
Executive Summary	3
Key Survey findings	3
What is Advanced Analytics?	4
Advanced Analytics Hits the Mainstream	4
Study Background	5
Figure 1: Percent breakdown of respondents by company size	6
Study Results	6
Drivers for Advanced Analytics	6
Figure 2: Motivation for Advanced Analytics	7
Advanced Analytics has many use cases	7
Table 1 – Example use cases for predictive modeling and pattern detection	7
Figure 3: Advanced Analytics use cases	8
Statisticians vs. business analysts as users of the technology	9
Figure 4: Users of Advanced Analytics	9
Figure 5: Requirements for individual to make use of advanced analytics	10
Challenges of Advanced Analytics	10
Figure 6: Challenges with Advanced Analytics	11
Benefits of Advanced Analytics	12
Figure 7: Benefits of Advanced Analytics	12
Conclusion	13
Appendix 1	14
Companies not deploying Advanced Analytics	14
Figure 8: Reasons for not deploying Advanced Analytics	14



Executive Summary

Advanced analytics is being embraced at an increasing rate by organizations that need to gain actionable insight from their vast amounts of both structured and unstructured information. While much of the technology that comprises advanced analytics has been around for decades, over the past several years, adoption has increased for a number of reasons. Factors contributing to the growth of advanced analytics include a better understanding of the technology, user friendly interfaces, increased computational power, the state of the economy, and the desire to extend the value of BI implementations to provide deep insights that can make a company more competitive. The market is quite dynamic, smaller vendors are being acquired by larger players and the introduction of cloud services in this area has been fueling growth.

As part of our research initiative into this market, Hurwitz & Associates conducted an online survey in January, involving more than 160 companies. The goal of the survey was to understand how companies are using advanced analytics today and what their plans are for the future. The respondents fell into two primary groups: those who were planning to deploy the technology as well as those who had already deployed it.

Key Survey findings include:

- **Predicting outcomes.** More than 75% of the respondents who were deploying advanced analytics were using it for pattern matching and to help predict outcomes. Predictive analytics is being deployed across many use cases. In addition to marketing related analytics for use in areas such as market basket analysis, brand loyalty, or churn analysis, companies are using the technology in new and innovative ways including finding patterns in health related data and predicting equipment failure.
- **End user shift.** In many cases, the users of advanced analytics are changing from statisticians and other highly technical staff to business analysts and other business users. Despite this shift, there are still concerns around business users adopting the technology.
- **Increase in adoption.** Regardless of company size, the vast majority of respondents expected the number of users of advanced analytics in their companies to increase in the next six to 12 months. In fact, more than 50% of respondents currently using the technology expected the number of users to increase over this time period.
- **Big value.** There is a huge business benefit to advanced analytics. More than 40% of the respondents who had implemented advanced analytics believed it had increased their company's top-line revenue. Less than 2% of respondents stated that advanced analytics provided little or no value to their company.

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What is Advanced Analytics?

Hurwitz & Associates defines advanced analytics as follows:

Advanced analytics provides algorithms for complex analysis of either structured or unstructured data. It includes sophisticated statistical models, machine learning, neural networks, text analytics, and other advanced data mining techniques. Among its many use cases, it can be deployed to find patterns in data, prediction, optimization, forecasting, and for complex event processing. Examples include predicting churn, identifying fraud, doing market basket analysis, and analyzing social media for brand management. Advanced analytics does not include database query and reporting and OLAP cubes.

There are several aspects of this definition worth highlighting. First, advanced analytics includes the analysis of both structured and unstructured data (either separately or together). In fact, many early adopters are looking to marry these two kinds of data to increase the effectiveness of their analysis. Additionally, advanced analytics is about more than analyzing customer-related data, although this is a huge use case. For example, advanced analytics can be used to understand and identify counter-terrorist activities, predict traffic patterns, monitor and analyze production processes, or to predict network outages. Real time analysis of large data streams is another use case that is also beginning to grow as is operationalizing advanced analytics as part of a business process.

Advanced Analytics Hits the Mainstream

While advanced analytics has been used by statisticians and mathematicians for decades, it was not as big a part of the analytics landscape as it is today. Consider that twenty years ago, statisticians in companies were able to predict who might drop a service using advanced survival analysis or machine learning techniques. However, it was difficult to persuade other people in the organization to understand exactly what this meant and how it could be used to provide competitive advantage. For one thing, it was difficult to obtain the computational power needed to interpret data that kept changing through time. Additionally, it could be nearly impossible to convince a call center, for example, that this analysis needed to be “operationalized” as part of a process to reach out to these at risk users.

Today, while some of these problems still remain, advanced analytics is definitely becoming more mainstream. With increases in computational power, improved usability of the tools, new algorithm development, and the need to obtain better insight from increasingly vast amounts of data, companies are pushing towards advanced analytics. Businesses now realize that better insights can provide a superior competitive position. The lure of advanced analytics is especially strong in the down economy. Why? Advanced analytics gives companies a way to truly understand their data and gain valuable insight that isn't available through typical “slice and dice” techniques that compare data across various dimensions (e.g. sales by region).

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And, what about the vendors providing these tools? The space is a fragmented one, with some vendors still targeting highly technical users, while others are targeting more mainstream business users as well. Larger players have also gotten into the act. Consider the number of acquisitions that larger vendors have made over the past few years. For example, IBM acquired predictive analytics vendor SPSS in 2009 and business analytics vendor Cognos the previous year. SAP acquired business analytics vendor Business Objects, which had acquired Inxight (a text analytics vendor). SAS Institute acquired Teragram (a text analytics vendor) in 2008. Tibco bought Insightful (a data mining company) in 2008. Open source models, such as R, have also received a lot of attention. And, a new group of cloud based advanced analytics vendors have entered the market.

Study Background

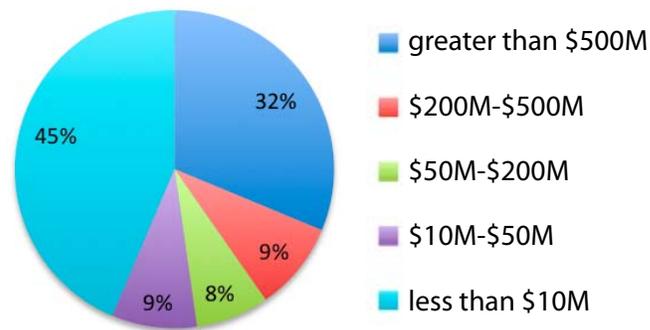
Hurwitz & Associates conducted an online research study of the advanced analytics market in late 2010. We surveyed slightly more than 160 companies across a range of company sizes and industries. Topics included:

- Motivation for advanced analytics
- Use cases for advanced analytics
- Kinds of users of advanced analytics
- Challenges with advanced analytics
- Benefits of the technology
- Experiences with BI and advanced analytics
- Plans for using advanced analytics

The survey was conducted in English only. The majority of companies surveyed were either planning to deploy the technology or had already deployed it. However, a small number of respondents had no plans to use the technology and this group of respondents provided some interesting insights, as well. Since the survey was not designed to calculate market size or adoption rates, we were satisfied that we could use the responses to represent the experiences of many companies planning to use and/or utilizing this technology. In fact, the results stayed relatively consistent throughout the fielding of the study. Figure 1, on the following page, illustrates the breakdown of respondents by company size.

... a small number of respondents had no plans to use the technology and this group of respondents provided some interesting insights ...



Figure 1: Percent breakdown of respondents by company size

(Source: Hurwitz & Associates, 2011)

Study Results

Drivers for Advanced Analytics

We asked both current users of advanced analytics technology as well as those who were planning to use it why they were interested in it. The top three reasons across both groups were to compete more effectively by gaining insight that wasn't available before, to better understand customer behavior, and to improve top line revenue through better analysis. More than 50% of current users were motivated to use advanced analytics in order to better understand behavior (customer and otherwise). For instance, many of these companies are interested in understanding the characteristics of customers who will buy, leave, or respond to a promotion. Overall, the responses indicated that these companies believed that gaining new insights into behavior would help them make better decisions that would enable them to compete more effectively.

Additionally, the majority of companies that have deployed advanced analytics solutions have already deployed a BI solution. In many cases, once companies are satisfied with their BI deployments and find value in them, they are eager to move onto utilizing more advanced methodologies. Hurwitz & Associates has seen similar behavior in past studies.

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Figure 2: Motivation for Advanced Analytics



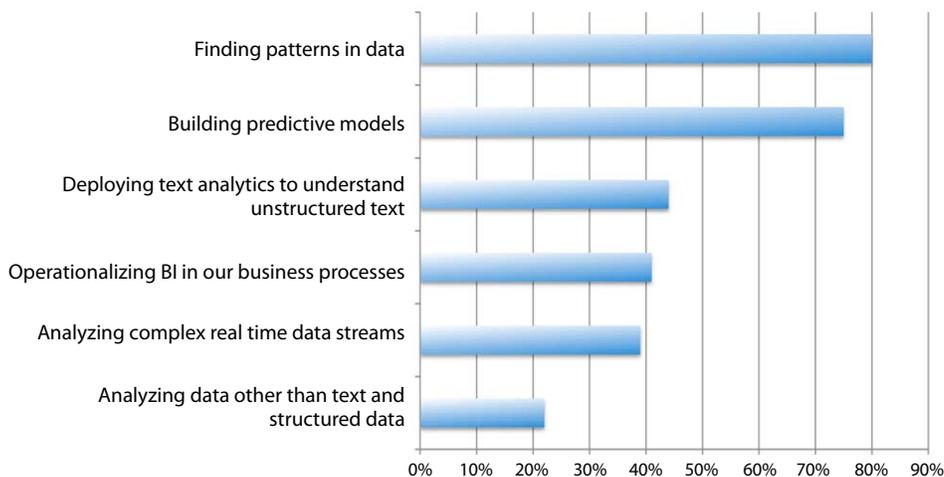
(Source: Hurwitz & Associates, 2011)

... there are a large and growing variety of use cases for predictive analytics.

Advanced Analytics has many use cases

We asked respondents who had already implemented the technology what kind of advanced analytics they had deployed. The top responses are provided in Figure 3, below. The overwhelming response was, “finding patterns in data” and “predictive modeling.” In fact, 80% of the respondents stated that they used advanced analytics to find patterns in data. Seventy-five percent stated that they used it to build predictive models. This is not surprising given that these two related technologies, in large part, are driving much of the buzz around the adoption of advanced analytics. And, many of these adopters are utilizing

Figure 3: Advanced Analytics use cases



(Source: Hurwitz & Associates, 2011)



predictive and pattern analytics in their marketing efforts. However, there are a large and growing variety of use cases for this particular kind of advanced analytics. These fell into three broad categories, as illustrated in Table 1.

Table 1 – Example use cases for predictive modeling and pattern detection

Category	Examples
Marketing Analytics	Market basket analysis, promotional mix, consumer behavior, customer satisfaction, community analysis, brand loyalty, churn analysis, consumption analysis, propensity to spend, profitability analysis
Business Analytics	Sales and budget forecasting, economic forecasting, business improvements, risk analysis, financial modeling
Industry Specific Analytics	Reliability assessment (i.e. predicting failure in machines), situational awareness, behavior (defense), investment analysis, fraud identification (insurance, finance), predicting disabilities from claims (insurance), finding patterns in health related data (medical)

(Source: Hurwitz & Associates, 2011)

In addition to finding patterns and building models, another trend in advanced analytics is using text analytics to understand unstructured text. Text analytics, which involves analyzing unstructured text and extracting relevant information, such as entities (people, places, things), facts, relationships, sentiment, or concepts, is becoming more popular, driven in part by companies' desire to understand what is being said about their products and services online or in their unstructured content repositories. While brand reputation management is one popular use case for text analytics, there are many others. For example, a growing number of companies are combining structured data from their data warehouses together with unstructured data from their call centers to better predict customers who might leave their product/service. Other companies, such as insurance companies are bringing structured data together with unstructured data found in claims forms to predict fraud. Still others are using it in eDiscovery activities.

For those companies in our survey that were actively assessing the technology or looking to employ advanced analytics in the coming year, the use-case picture is similar, with one distinction. Whereas those respondents who were already using the technology were employing it primarily for its pattern matching and predictive capabilities, those who were actively assessing it were also looking to deploy it as part of a business process. In fact, almost 50% of these respondents were looking to deploy advanced analytics in this manner. Companies appear to be shifting their use of advanced analytics from simply building models to operationalizing them as part of a business process. One example of this is to use advanced analytics to provide information to call center agents to upsell a customer. Another example is high volume trading, where data would be analyzed as part of the trading process.

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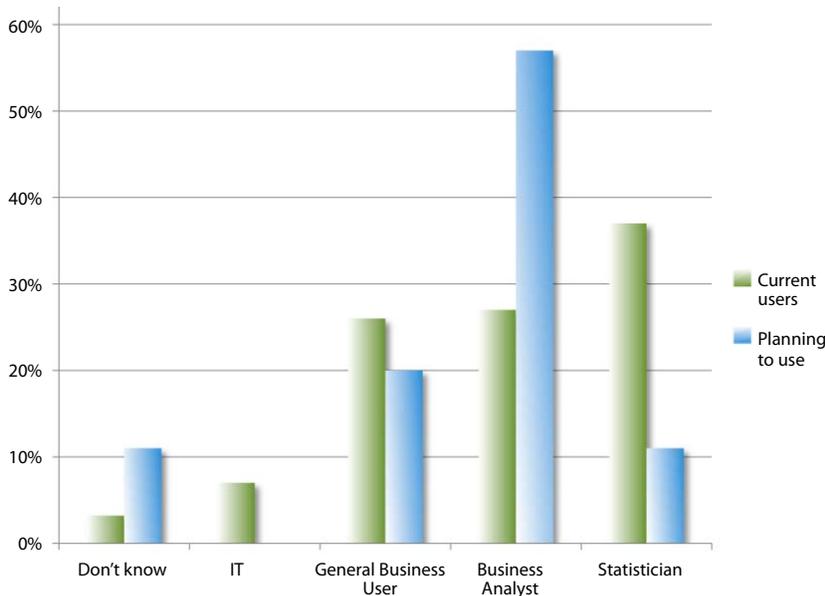
Statisticians vs. business analysts as users of the technology

Hurwitz & Associates was interested in understanding who was using advanced analytics technology within a company. There has been a lot of hype in the market around the notion that anyone with knowledge of the business could utilize advanced analytics and make it work if the interface was easy enough to use. Some vendors have been fueling this hype. They have been providing user interfaces, for example, which suggest or dictate what model should be used, given a certain set of data. This has become a trend in the market and it is reflected in the survey results.

Close to 40% of the respondents who currently deploy analytics have employed statisticians or mathematicians to do so. This is especially true for larger companies. Only 10% of the companies planning to use advanced analytics believe that statisticians will utilize the technology most heavily in their organization. Therefore, there is big perceived shift towards business analysts as users of the products/services.

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Figure 4: Users of Advanced Analytics

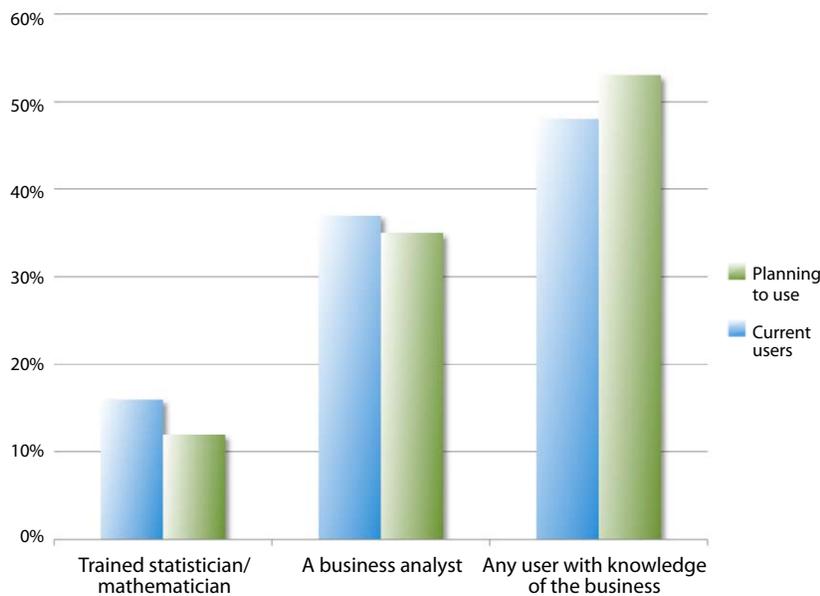


(Source: Hurwitz & Associates, 2011)

Moreover, both current users and future users of the technology believe that business analysts can make good use of advanced analytics. We asked the following question: "Which statement BEST describes the requirements for someone to make use of advanced analytics software for analysis purposes?" The responses from both current and planned users of the technology indicate that respondents believe that business users, whether analysts or any business user with the right interface, could effectively use advanced analytics for analysis purposes (Figure 5, following page). Digging deeper into the data, we found approximately 80% of respondents from larger companies still believed

that any business user with either knowledge of the business or a good user interface should be able to use advanced analytics. Only 20% of large and mid sized business respondents believed that the user needed special training in statistics or mathematics.

Figure 5: Requirements for individual to make use of advanced analytics



(Source: Hurwitz & Associates, 2011)

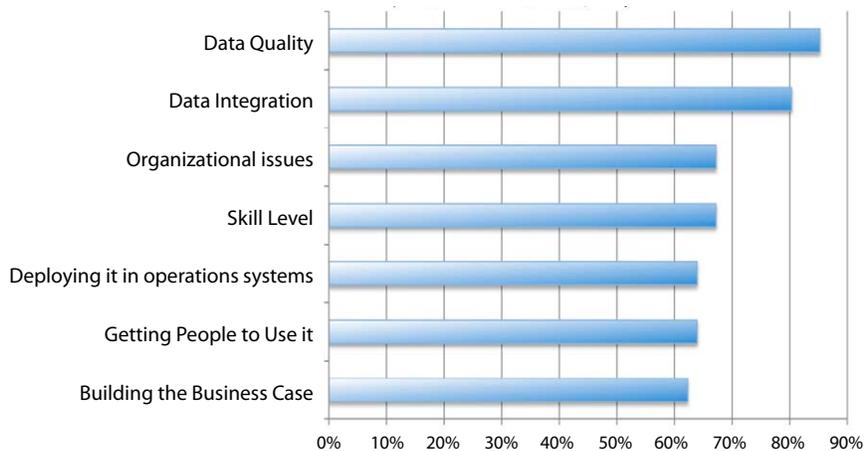
Additionally, regardless of who in the organization is utilizing the technology or plans to use the technology, the majority of respondents stated that that they expect the number of users to increase in the next 6-12 months.

Challenges of Advanced Analytics

While companies believe that business users can make effective use of advanced analytics, they express concerns with this technology. We asked respondents about the challenges they currently face or believe they will face with advanced analytics. These challenges fell into different buckets including technical challenges, cultural challenges, and financial challenges. More than 80% of respondents cited data quality and data integration as the top two issues they have encountered or believe they will encounter with advanced analytics (see Figure 6, following page).

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Figure 6: Challenges with Advanced Analytics

(Source: Hurwitz & Associates, 2011)

This is not surprising, considering the problems companies have already had with this in the past with BI implementations. However, the next set of challenges that respondents cited were more cultural and organizational in nature. For instance, approximately 75% of those respondents who were actively assessing the technology were concerned about “getting people to use the products” and the “organizational issues around advanced analytics.” There was also some concern about the skill level of the users. These were consistent with the experiences of those who had already deployed the technology. It appears that while the market may think that a more extensive set of people can make use of the technology, and the plan appears to be to roll it out to them, there are still concerns about what it will take to make advanced analytics really work in an organization. The reality is that there is a certain mindset and skill set that is needed to utilize analytics effectively. Training will certainly be necessary for business users attempting to either build models or make use of the output of certain advanced analytics (e.g. predictive analytics) in a meaningful way. Additionally, people are used to doing their jobs a certain way. Comments in the survey reflect this concern. For example, one respondent stated that, “The mind is wired to do routine work beautifully. However, it stumbles when there is a fundamental change...to the environment.” Another respondent noted that, “Converting this (advanced analytics) to day to day action which is perceived valuable is biggest challenge.” Still other respondents acknowledged that building workable models can be “hard.”

Finally, many respondents also mentioned the high cost of the solutions and finding the right solution to meet their needs. For example, a number of respondents noted that “comparing” solutions was difficult. One respondent stated, “Everyone agrees advanced analytics is necessary to run our business. There are so many companies offering analytics, so it can be difficult to compare apples to apples when deciding on what to purchase. In addition, costs for these packages vary a lot depending upon the complexity of what we are trying

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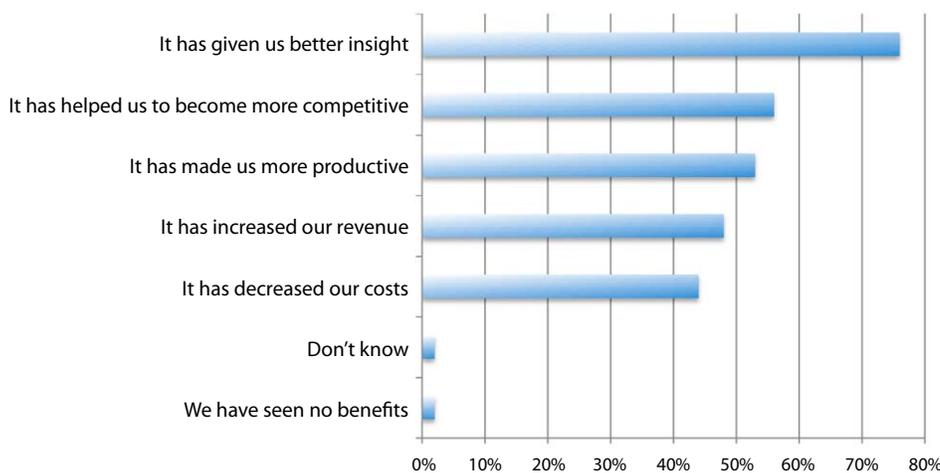
to accomplish. And, an off the shelf package rarely seems to do the job—consulting is needed to bolt on to the software, which is another cost.”

Benefits of Advanced Analytics

While current users of the technology have experienced some challenges, companies that have deployed analytics have none the less experienced significant benefits. By far, the biggest benefit of advanced analytics was “better insight.” In fact, 75% of the respondents stated this as a benefit of advanced analytics (see Figure 7, below).

By far, the biggest benefit of advanced analytics was “better insight.”

Figure 7: Benefits of Advanced Analytics



(Source: Hurwitz & Associates, 2011)

Indeed, more than 50% of respondents stated that advanced analytics has made them more competitive. And, 47% responded that it has increased top line revenue. Other respondents noted that advanced analytics “helps them navigate a complex world while reducing risk.” In fact, quite a few respondents spoke about the link between advanced analytics and reducing risk.



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Conclusion

It is an exciting time for the advanced analytics market. There is a great deal of buzz about the technology but more importantly, companies are beginning to truly understand its value. Perhaps it is a perfect storm of factors: the state of the economy, changes vendors have made to products, and computational capacity that has increased awareness of the technology and its potential benefits. Whatever the cause, there is no doubt that companies are embracing the technology as a way to gain valuable insight into their increasing amounts of data.

However, while the results of the survey pointed to increased adoption of the technology by a different class of users, the buyer should beware. As study respondents pointed out, there is a wide range of products on the market providing advanced analytics. Companies will need to evaluate these products carefully to fit their specific needs. Hurwitz & Associates recommends that organizations think about the following issues when considering advanced analytics:

- What is the problem your organization is looking to solve? It is important that organizations understand the questions they are looking to answer when considering any kind of technology. Advanced analytics is no exception. There are vendors that provide industry-specific solutions as well as those that provide horizontal solutions. The organization should determine which kind of provider makes sense for its particular problem.
- What is the skill set of the people in your organization? Are they up to the task? Employee skill levels may dictate the kind of solution that an organization can put in place. If the company does not have highly technical users on staff but needs to create complex models, it may make sense to outsource the process to a provider that can develop and run the analysis itself, either on a company's own premises or in the cloud. Another option is that a skilled person develops the model and some form of the model is then provided to a larger set of users. There are a range of different delivery models for advanced analytics that should be considered. It will be important that anyone using advanced analytics technology for analysis to have an understanding of what they are doing. A predictive model (for example) in the wrong hands can be dangerous. Training will be a must.
- Organizations need to prepare for cultural change. Regardless of who is doing the analysis and how the analysis is going to be deployed, advanced analytics will change how companies operate to make decisions. This means companies need to anticipate issues and plan accordingly.
- Don't forget the data. Respondents reported that data issues such as quality and integration were still their biggest challenge when it came to deploying advanced analytics solutions. So, organizations need to consider how they will handle data issues here, as well.

A predictive model ... in the wrong hands can be dangerous.



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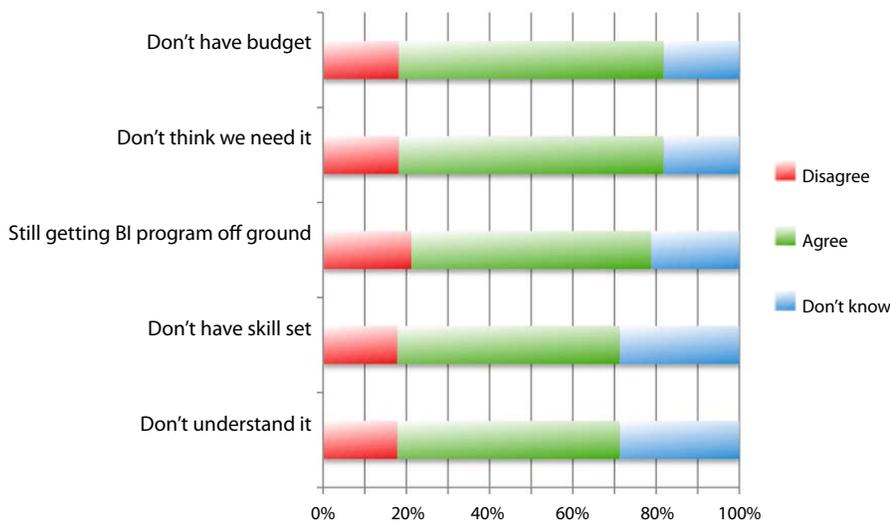
Appendix 1

Companies not deploying Advanced Analytics

We asked companies that were not planning to deploy advanced analytics, why this was the case. We were particularly interested in understanding whether there were budgetary reasons for it, whether companies still felt they didn't understand the technology enough to use it, didn't have the skill set, were still dealing with basic BI implementations, or simply did not feel they needed it to run their business. There are a range of reasons why companies are not deploying advanced analytics. No one reason stood out from the rest. In some instances, the companies felt that they were still struggling with their basic BI program. Interestingly, these reasons varied by company size.

There are a range of reasons why companies are not deploying advanced analytics.

Figure 8: Reasons for not deploying Advanced Analytics



(Source: Hurwitz & Associates, 2011)

For example, smaller companies were more likely to respond that they did not have the budget for advanced analytics. Larger companies seemed more concerned about the skill set needed to deploy it. Across the board, there was still some confusion around what advanced analytics could do for the company.



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175 Highland Avenue, 3rd Floor • Needham, MA 02494 • Tel: 617-597-1724
www.hurwitz.com