The very best of TDWI’s BI articles, research, and newsletters

Volume 8

2010 in Review:

Anything Goes

but the Status Quo

Plus 2011 Forecast:

Analytics—A New Nexus for Business Intelligence

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Transforming Finance
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## ABOUT TDWI
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— Steve Collins
President, Analytics Division
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Welcome to the eighth annual TDWI’s Best of Business Intelligence: A Year in Review. Each year we select a few of TDWI’s best, most well-received, hard-hitting articles, research, and information, and present them to you in this publication.

Stephen Swoyer kicks off this issue with a review of major business intelligence (BI) developments. “2010 in Review: Anything Goes but the Status Quo” names insurgent BI and a return to end-user-oriented BI offerings as some of 2010’s trends. Swoyer says that 2010 was “the year in which frustrated users started sharpening their pitchforks.”

In “2011 Forecast: Analytics—A New Nexus for Business Intelligence,” TDWI Research analyst Philip Russom shares his predictions for the coming year. Russom asserts that advanced analytics has become a nexus for BI and data warehousing, and discusses how it affects current trends.

To further represent TDWI Research, we’ve provided excerpts from two of the past year’s Best Practices Reports. Wayne Eckerson’s “Transforming Finance” explains how forward-thinking finance departments are transforming into strategic advisors to the business, and “BI on a Limited Budget,” also by Eckerson, offers BI teams innovative strategies for doing more with less.

This volume’s Ten Mistakes to Avoid will help you avoid some common pitfalls in driving BI adoption and managing change. And thanks to articles from TDWI’s e-newsletters, you’ll learn more about BI costs, BI team management, advanced analytics, and agile data integration.

In “Educating the Next-Generation BI Workforce,” one of our selections from the Business Intelligence Journal, Barbara H. Wixom, Hugh J. Watson, Olivera Marjanovic, and Thilini Ariyachandra discuss the increasing interest in BI education and suggest that BI practitioners become involved to help shape it. Our second Journal piece, “Learning Competitive Intelligence from a Bunch of Screwballs” by Troy Hiltbrand, uses a historical event from World War II to demonstrate competitive intelligence techniques.

TDWI is committed to providing industry professionals with information that is educational, enlightening, and immediately applicable. Enjoy, and we look forward to your feedback on the Best of Business Intelligence, Volume 8.

Denelle Hanlon
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Where will your data take you?

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It’s that time of year again. Every winter, we look back at the year just past, highlight some of its most intriguing trends, and hazard a few guesses about what the New Year will have in store.

Join us as we take a look at the year that was 2010—as well as the year that could well be 2011. Hint: it’s full of iPods and iPads.

As the Specialty Data Warehouse World Turns
At last ... at long last. After more than a few false starts, starting with Microsoft’s acquisition of the former DATAAllegro in July of 2008, the data warehousing (DW) space experienced something very like consolidation this year. First, in June, SAP AG picked up Sybase, proprietor of—among other assets—the suddenly resurgent Sybase IQ columnar database. Then, in July, storage giant EMC picked up veteran analytic database specialist Greenplum Software.
Finally, in September, IBM nabbed the grand-daddy of them all—data warehouse appliance specialist Netezza—for a cool $1.7 billion.

**IF ANYTHING, AND IN SPITE OF THE BEST-LAIRED GO-TO-MARKET EFFORTS OF THE BI SUITE PLAYERS, ADOPTION HAS HELD STEADY.**

Specialty data warehouse players started getting gobbled up because big name players started paying attention—or a lot more attention—to big data, but in and of itself big data wasn't enough to move hardware. Netezza (and its competitors DATAllegro and Dataupia) had tried that, with mixed results.

It wasn’t until big-data-the-technology-prescription got hitched to advanced-analytics-the-killer-application that the specialty data warehouse express really got going. In 2010, nearly everybody was talking about big data, usually in connection with some kind of advanced analytic application.

In a growing number of cases, that application was MapReduce. Aster Data Systems and the former Greenplum were first out of the gate with support for MapReduce (way back in September of 2008), but 2010 saw a rush of MapReduce-oriented activity, chiefly involving Hadoop, an open source implementation of the MapReduce framework. IBM, Teradata, Netezza, Talend, and Informatica, among others, announced Hadoop integration plans.

The argument goes like this: the traditional data warehouse—powered, in most cases, by a commercial, off-the-shelf (COTS) database package—just isn’t up to the task of managing and effectively crunching big data. What’s needed is either a row-based data store powered by a massively parallel processing (MPP) engine, or—even better, according to some—an MPP-based columnar store. Although an MPP or columnar architecture lets you scale to manage big data, a technology such as MapReduce gives you the analytic horsepower to crunch big data. That’s the version of the story that many vendors—depending on their architectures, market niches, and (of course) differentiators—like to tell.

**A Dream Deferred—Again**

To most of us, the benefits of BI are so obvious that the enthusiastic adoption of BI technologies by users at every level in an organization seems like a no-brainer—like something that must and will come to pass. Eventually. Inevitably.

“Inevitably” is certainly taking a long time, however. If anything, and in spite of the best-laid go-to-market efforts of the BI suite players, adoption has held steady.

In our end-of-year wrap-up last year, for example, we saw that BI adoption actually regressed. This year, several interests sought to draw new attention to this trend.

First, there was the Business Application Research Council (BARC), which continues to publish the BI Survey that OLAP market oracle Nigel Pendse first made famous. In the ninth edition of the BI Survey, BARC found that only about 10 percent of enterprises have managed to deploy BI to a majority of their users.

In an earlier study, industry luminary Howard Dresner, who’s credited with coining the term “BI,” highlighted another intriguing trend: the influence of IT in the BI buying process seems to be waning, even as that of the line of business is increasing. Line-of-business customers are increasingly likely to adopt and (in some cases) even deploy BI tools without first soliciting IT’s approval, according to Dresner.

This trend has encouraged ISVs to rethink the ways in which they develop, license, and market their software. It has likewise encouraged a kind of bottom-up counterrevolution—let’s call it an insurgency—in BI and DW.

**Insurgent BI: Anything Goes but the Status Quo**

When all is said and done, 2010 might well go down as the year in which frustrated users started sharpening their pitchforks.

As a prescription to lagging user adoption, we’ve noted in previous articles a return to “workgroup”—or end-user-oriented—BI offerings. In one of the most intriguing trends of 2008 and 2009, several such offerings, including LyzaSoft’s Lyza analytic workbench, QlikView from QlikTech, Microsoft’s then-gestational “Project
Gemini” (the column-store-on-a-desktop add-in that Redmond designed for Excel 2010)—either came to the fore (in the case of Lyza) or began making a good bit of noise (in the cases of both QlikView and Microsoft).

This year we saw what might be called an “insurgent” trend in BI, where upstarts such as Bis2, WhereScape, Kapow, and even Expressor Software (which effectively relaunched its flagship Expressor product in October) joined workgroup BI advocates in championing an anything-goes-but-the-status-quo approach to business intelligence, data warehousing, and even data visualization.

Veteran data warehouse architect Mark Madsen offered a neat summary of insurgent BI in his keynote address at the 2010 TDWI World Conference in Las Vegas.

Using the metaphor of a road-building project that paves over an existing, albeit twisting and turning, cow path, Madsen urged against what might be called path-of-least-resistance BI. Yes, he concedes, the cow path is already there. Yes, it’s well-understood; yes, it’s functional; and, yes, it goes (eventually) where you need it to go. However, this doesn’t mean it’s the shortest, most direct, or most advantageous route, he stressed.

That, in a nutshell, is the argument for insurgent BI. Although BI suites aim to appeal to both IT and the line of business, insurgent BI offerings are designed primarily with end users in mind. Insurgent BI likewise makes virtues out of its most egregious liabilities: in the case of a vendor such as WhereScape, this could be its perceived immaturity (i.e., its lack of fit and polish relative, at least, to full-fledged data integration offerings from suite vendors such as IBM, Oracle, SAP AG, or SAS). A vendor such as Bis2, on the other hand, likes to champion an unconventional approach to data visualization that a data visualization purist might find objectionable.

In every case, insurgent BI emphasizes empowerment by virtue of, for example, rapid-time-to-deployment DI (in the case of ETL tools such as WhereScape’s RED or Expressor 3.0); analytics optimized for both user self-service and collaboration (in the cases of Lyza and QlikTech); or data visualization that distorts—in some cases, critics allege, drastically—to enlighten. (This last category was effectively inaugurated by Bis2.)

What’s intriguing is that the once-modest revival of “workgroup BI” has developed into an irksome—if still far from momentous—market force.

Insurgent BI bears watching in 2011.

Social Studies

In 2010, BI—like just about everything else—got a little bit more sociable.

LyzaSoft kickstarted the revolution in February, at TDWI’s World Conference in Las Vegas, unveiling a Lyza 2.0 release that incorporates social media concepts and methods, including searching, matching and combining, tagging, sharing, commenting, and rating—into an analytic context.

Industry watcher Ted Cuzzillo argued that Lyza 2.0 stole the show at TDWI Las Vegas. He might’ve been on to something: Lyza’s social media retrofit had conference attendees, third-party vendors, and industry analysts buzzing.

Not all of this buzzing was salutary, of course. Fact is, Lyza’s push into social BI begs those most timeless of questions: wherefore and what for?

Ten months later, many still can’t agree on the wherefore (to say nothing of the what for). Advocates argue that social networking concepts and methods are logically consistent with the evolving BI user experience; skeptics point to social networking concepts and methods that—while likely of some value—could prove to be more distracting and productivity-killing than beneficial.

Not surprisingly, the push to incorporate social networking concepts and methods into BI or DW likewise reprises a familiar theme: that of insurgent BI.

In social BI, users are ascendant, argues LyzaSoft CEO Scott Davis; as a result, IT and DM stakeholders—who have traditionally hoarded power—are going to have to relinquish some of their most cherished beliefs.

“You have to be realistic about it. You’re not going to be able to impose a priori that sort of top-down model where you control everything centrally,” Davis said. “It’s sort of turning
everything upside down. You're saying that instead of IT, the users become the incubation zone for new ideas and IT comes along and picks the best of them and migrates them into different places.”

IN 2010, BI—LIKE JUST ABOUT EVERYTHING ELSE—GOT A LITTLE BIT MORE SOCIABLE.

As of December, Lyza is probably still the most sociable of BI tools. The rest of the industry has had nearly 12 months to take stock, however.

If Davis is right, and if social BI is inevitable, then any BI player worth its salt is going to have to have a social strategy. In fact, 2011 could be the year in which BI gets a top-to-bottom social retrofit. How well it fits anybody’s guess.

Going Mobile
In April, Apple introduced the iPad, a category-redefining deliverable that—in the eyes of many—recast the PC as bloated and bulky. Compared to the sleek and stylish iPad, the thicker, bulkier Tablet PC—to say nothing of the cumbersome end-user desktop—seems downright inconvenient.

BI vendors were quick to adopt the iPad as a next-generation client device, and although it’s far too early to say that the iPad has affected BI, it seems likely that mobility will transform both BI and DW. In this regard, an iPad-like device could become the killer medium for mobile BI. After all, an iPad-like interface, with touch-screen interactivity and vivid LED-backlit display, shows visual elements such as dashboards to great effect.

The list of BI types that are supporting the iPad includes prominent analytics vendors (e.g., QlikView, SAP BusinessObjects, MicroStrategy); best-of-breed data visualization players (TIBCO Spotfire); and CRM vendors (salesforce.com and SugarCRM). At least one vendor—MeLLmo, developer of Roambi—markets BI-oriented reporting, analysis, and (limited) visualization offerings specifically for the iPad and iPhone.

With Samsung, Research in Motion, and other vendors unveiling iPad-like devices of their own—and with industry watcher IDC projecting that the combined base of smartphones and tablet computers will surpass that of the PC by 2012—look for mobile BI to have a huge impact in 2011.

As for the meaningful intersection of mobile BI and social BI, let’s circle back next December. We could be publishing a special iPad-only edition by then.

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Before I discuss trends in business intelligence (BI) and data warehousing (DW) that are wending their way out of 2010 and into 2011, allow me to set the scene with a limerick I wrote long ago:

There once was a young man from Texas
Who pondered his set subcomplexes.
The inclusion relation
And complementation
Both led to the set he called nexus.

The word *nexus* is Latin for connection or center. The limerick alludes to how a subset that’s common across several sets may be considered a center—or nexus—around which related sets pivot. In this definition, the inclusion relation is the primary set-based operation for defining a nexus.

As you know, BI tools apply set operations to locate a nexus within a data set. Just look at the result of any multidimensional OLAP query or the output of a predictive model.

But that’s not the kind of nexus I want to talk about today. Instead, I want to help you understand trends in BI by showing that most of them relate to a common nexus—namely, advanced analytics.

As background, note that there are different approaches to analytics, and the current trend is toward “advanced analytics,” as opposed to rudimentary forms, such as online analytic processing (OLAP). OLAP and its variations are by far the most common analytic approaches in use today, usually implemented as parameterized reports fed by a static cube of carefully prepared data. This differs from advanced forms of analytics, based on data mining, predictive analytics, complex SQL, MapReduce, natural language processing,
statistics, and/or artificial intelligence. The advanced forms enable the discovery of unknown facts (far more broadly than OLAP can) by supporting ad hoc analytic methods against unknown or changing collections of lightly prepared data.

Why advanced analytics? The business reason is that user organizations need advanced analytics to make sense of recent changes in their customer bases, operational expenses, marketplace, competitive landscape, supply chain, and so on. Advanced analytics helps managers understand recent changes and how best to respond to them, ranging from operational cost cutting to spotting new sales opportunities.

TDWI expects the current economic turmoil to continue, which means more organizations will dive deeper into analytics to understand change, then adapt and thrive. The adoption of advanced analytics is made challenging, because it’s often implemented with other challenges to BI and DW, such as terabyte-scale data management and real-time information delivery.

And that brings me back to the point of this article. The current growth of analytics affects just about everything else involved in BI and DW, which makes analytics a kind of nexus for your BI and DW programs. To corroborate my claim, I’ll discuss a number of tools, teams, techniques, and trends common in BI and DW today, and demonstrate how each is affected by advanced analytics.

Big data. We all know that data volumes are exploding and will continue to do so. As if that’s not challenging enough, analytics is driving up data volumes, too, as users conduct advanced analytics with ever-larger analytic data sets. To help quantify the trend, a recent TDWI survey asked: “What’s the approximate total data volume that your organization manages specifically for advanced analytics, both today and in three years or so?” Survey results show that small-to-medium-size analytic data sets (3 TB and smaller) will get less prominent, whereas very large ones (10 TB and larger) will become more common. Those are average data volumes; many organizations are already analyzing petabytes of data.

Real time. Call it what you will: real time, near time, right time, or on demand. It’s all about fetching fresh data and integrating it into a target within seconds. Over the years, we’ve seen the refresh of standard reports move from weekly to overnight to multiple times daily to on demand. Similar to the journey reporting has made, analytics is now moving toward real time.

The current growth of analytics affects just about everything else involved in BI and DW, which makes analytics a kind of nexus for your BI and DW programs.

In-memory databases. To push reporting and analysis closer to real time, you need fast queries and data processing. One way to get that speed is to cache BI data in server memory, a practice TDWI has seen explode in recent years. The most typical in-memory BI data structures are tables (containing metrics for management dashboards), OLAP cubes (for on-demand multidimensional analysis), and predictive data models (for frequent rescoring). In-memory analytics is driving many organizations to finally upgrade to 64-bit hardware and software (which supports very large memory spaces). On the leading edge, high-speed analytics is driving some firms to solid-state drives.

Mixed workloads. There’s a long tradition of isolating non-reporting workloads (such as real-time or detailed source data) off a DW. Proof of this tradition is seen in the many thousands of operational data stores (ODSs) deployed by users. This tradition has expanded recently to include additional “systems on the side” (as I call them) in support of analytic workloads. Given the unpredictable nature, quickly evolving data, and demanding query or scoring workload of advanced analytics, it’s no wonder users are offloading analytic data from a DW to a secondary platform called an analytic database.

Analytic databases. Any database management system (DBMS) can manage a collection of data assembled for analytics—to a certain degree. But software vendors have, in recent years and in response to user demand, produced new DBMSs that are purpose-built for analytics. Many new analytic DBMSs are now available, based on appliances, columnar data stores, MapReduce, and open source. Some of these are available through clouds or software-as-a-service licenses.

Data warehouse appliances. These are a special niche within the new category of analytic
A true DW appliance is an integrated DBMS and hardware server, both purpose-built for DW or analytics. Some appliances are more like a hardware and software bundle that has been optimized for DW. Although some users make an appliance their DW platform, TDWI estimates that greater than 90 percent of deployed DW appliances host a departmentally focused multi-terabyte analytic data mart—or “teramart.”

**Is the teramart a spreadmart on steroids?** Because teramarts and other independent analytic databases are useful to a business, many users today have a high tolerance for them—as long as they don’t proliferate uncontrollably. If you’re experienced in data warehousing, you know there’s a danger in allowing unauthorized data marts, spreadsheets, and other personal productivity databases, which TDWI collectively calls “spreadmarts.” Organizations deploying analytic databases should give them greater quality of content and controlled usage than the average spreadmart receives.

**Analytic sandboxes.** Instead of allowing users to create their own unauthorized BI data stores, some organizations are giving users sandboxes. A sandbox is a data set with isolated BI tool and server resources, such that the user can spawn just about any kind of workload without affecting overall DW performance. Sandboxes are best implemented atop the pooled resources of a group of virtualized hardware and software servers—otherwise known as a cloud. Now, let’s be honest: most organizations first enter into virtualized servers for data center redesigns or greater efficiency with numerous operational application servers. However, when they finally bring BI and DW onto the cloud, the reason is almost always some form of analytics, often in a sandbox model.

**Distributed data warehouse architectures.** Let’s pause and summarize for a moment. You can see from the eight issues I just discussed that analytics is affecting most areas of data warehousing, indeed serving as a nexus. Across these eight issues, however, we can also see one of the strongest trends in DW today. Although data warehouse architectures tended toward centralization and consolidation circa 2001–2004, they are now strongly trending toward distributed architectures. One of the leading drivers of this trend is the proliferation of workloads not suited to how most users have designed their enterprise DWs. And advanced analytics is the fastest growing workload.

**GIVEN ITS CONNECTIONS TO SO MANY TECHNIQUES, TOOLS, TEAMS, AND TRENDS, ADVANCED ANALYTICS HAS, INDEED, BECOME THE NEW NEXUS FOR BI.**

**Departmental BI and analytic applications.** A trend we’ve been tracking at TDWI is a shift in focus onto departmental BI requirements. Some organizations deal with this by maintaining a central DW and BI program, which addresses both enterprise and departmental requirements. Yet some rogue departments throw centralization to the wind and develop their own “shadow IT” to enable departmental BI. If you think about analytic applications for a moment, you’ll realize that most are departmentally focused by nature. For example, customer base segmentation is often funded by and for the benefit of sales and marketing departments. Fraud and risk analysis is for the actuarial department. Supplier or product quality analysis is for the procurement or supply chain teams. As these and other analytic applications proliferate, their presence fuels the shift toward departmental BI.

**Text analytics.** Given that some methods of advanced analytics—especially data mining and statistical analysis—produce the best results when given a large data sample, users in some situations are using text analytics to generate even more data for analysis. For example, the claims process in insurance produces a lot of textual data. Insurance companies are traditionally well vested in the use of data mining and statistical analysis, for the sake of fraud detection and actuarial calculations. In recent years, many have extended these analytic applications by implementing text analytics, which both enlarges and broadens the data sample for advanced analytics. Other text-laden industries are doing the same, namely government and healthcare.

**Data integration.** As the conduit for bringing data into a DW, data integration (DI) tools, teams, and techniques are all affected by analytics, just as much as the DW is. Yet one issue stands out: preparing data for analytics is not the same as ETL for data warehousing. Likewise, techniques for data quality (DQ)
are not the same. After all, discovery-oriented advanced analytics depends on outliers and nonstandard data to spot bad things, such as potential fraud and risk, as well as good things, such as new markets and customer segments. If a DI or DQ solution transforms or standardizes these out of existence, the data loses its analytic power. Furthermore, analytic tools based on data mining or statistics—as well as analytic DBMSs—are usually optimized for large data sets of fairly raw and detailed source data. Depending on your analytic method, you may need to scrimp on DI and DQ during an analytic project. Yet you’ll need to apply the usual best practices of DI and DQ (metadata and master data, too) before data developed via analytics is allowed into a DW.

**Agile BI.** A common question business users ask is: “Why does it take so long to get data into the DW and create a new report?” The answer is that DW and report data has to meet high, exacting standards, and that takes time. User angst is usually directed at reports, but it also applies to analytics. More and more, advanced analytics is a reactive process, where the careful process of preparing data and testing reports is reduced or completely sidestepped. This is extremely agile, though not necessarily in a positive way. Even so, I’ve interviewed users who are adapting the accelerated work habits of advanced analytics so they can speed up DW revisions and report creation.

**Summary and Conclusions**

By now, I hope I’ve convinced you that the growth of advanced analytics is affecting almost everything we do in BI and DW, plus related practices such as data integration and areas I don’t have space to discuss today (such as staffing, training, sponsorship, funding, governance). Given its connections to so many techniques, tools, teams, and trends, advanced analytics has, indeed, become the new nexus for BI.

But what does that mean to you? If you personally are initiating a new program for advanced analytics or taking an existing program to a more sophisticated level, you’ll need to collaborate with a wide range of colleagues to ensure they understand and make the many adjustments that are required for analytic success. If you work in areas that don’t seem related to analytics (such as data integration or warehouse modeling), don’t be surprised if you’re called on to support advanced analytics more deeply than ever. Business people need to be proactive in defining corporate goals and how advanced analytics must support these. Otherwise, analytic programs may miss their real target, namely to identify business change (both problems and opportunities) so the business can adapt and thrive in a rapidly changing business and economic climate.

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The New Role for Finance

At an increasing number of companies, forward-thinking finance departments are transforming themselves from back-office providers of accounting services to strategic advisors to the business. To facilitate this metamorphosis, forward-thinking finance departments have reengineered how they handle information, treating it as a valuable corporate resource that not only paints a picture of the past but also paves a clear path to the future.

Historical Role. Historically, the finance department has kept the books, managed the budget, and looked after cash, capital, taxes, treasury, and statutory reporting. But there is less tolerance in an increasingly competitive global economy for people and processes that don’t add direct value to an organization. As with other shared services (e.g., information technology and human resources), there has been a movement in the past decade to transform these finance functions into more active contributors to the bottom (and top) lines of the organization.

Finance, in particular, can be a powerful agent of organizational change. That’s because it sits at the information nexus of the organization. It collects financial and non-
financial data from every business unit on a regular basis and consolidates that information into summary and detailed management reports. But to add real value to the organization, finance needs to move beyond basic data collection and reporting. It must mine the information it collects for trends, patterns, and insights so it can advise the business how best to improve operations, optimize performance, and adapt to changing business conditions.

Partnering with the Business. Forward-thinking finance departments form tight partnerships with the business. They collaborate with business managers on a range of issues that ultimately drive financial performance: how to optimize pricing, reduce inventory, rationalize sales commissions, improve the profitability of merchandise assortments, reduce call center costs without affecting service, streamline provisioning and procurement processes, and make build-versus-buy decisions. Finance might also help the business evaluate whether to extend store hours, source parts from a new supplier, merge with another company, or take on a new partner.

“We need to collaborate with the business if we are going to improve the financials,” says a CFO from a major online retailer who asked not to be named. “Showing them actuals and targets isn’t enough; we need to help them reengineer fundamental processes. In short, we need to change from being a financial record keeper to a proactive partner with the business.”

Room to Improve. Unfortunately, the majority of finance departments have yet to adopt this new role to a significant degree. Our survey shows that although the finance department has made strides toward becoming a trusted partner with the business, it still has a long way to go.

Less than half of financial professionals who responded to the survey believe their finance departments, to a high degree, help the organization “achieve its objectives” (41%), “refine strategies” (35%), “drive sales” (29%), or “optimize processes” (29%). In fact, more than 20% of finance professionals gave their finance teams a low rating in these areas, with a larger percentage saying in effect that the finance department does little or nothing to help the business “optimize processes” (43%) or “understand and help drive sales” (50%). (See Figure 1.)

However, when you examine the high and medium scores in each area, about three-quarters of finance professionals believe the finance department helps the business in these areas to some degree. This shows that finance understands its new role and is making progress toward fulfilling it but is not yet executing at a high level. This is good news, since the rallying cry about the need to transform finance has been around for more than a decade.

Divergence from BI. Not surprisingly, finance/business respondents had a more favorable opinion of the finance department’s impact on the business than BI professionals did. This gap reflects a yawning divide between finance and the BI professionals who manage the finance department’s most precious asset: data. This report will examine this organizational divide in detail and prescribe remedies to close it.

Single Version of Truth

Information Infrastructure. Finance departments that proactively advise the business have at least one thing in common: they’ve standardized financial information throughout the organization and harmonized it with detailed transaction data used by the business. This provides a consistent set of information that both finance and business unit managers can use to understand past activity, forecast the future, and make important decisions.

This so-called “single version of truth” liberates the finance department to focus on value-added activities that drive business performance. “Our finance community has been a big proponent of a single version of truth and enterprise business intelligence because it has helped them undergo a major transformation,” says Bobby Ghoshal, manager of enterprise business intelligence at Freescale, a semiconductor manufacturer in Tempe, Arizona. “Our finance team now spends 80% of their time analyzing data and providing value to the business, and 20% collecting it, instead of the other way around.”

To what degree do you agree with the following statements?

“… helps drive the organization to achieve its objectives.”

<table>
<thead>
<tr>
<th>Finance/Business Professionals</th>
<th>BI/IT Professionals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HIGH</strong></td>
<td><strong>MEDIUM</strong></td>
</tr>
<tr>
<td><img src="image" alt="Percentage" /></td>
<td><img src="image" alt="Percentage" /></td>
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</table>

Figure 1. Less than half of survey respondents thought the finance department provides a strategic advisory role to the business to a high degree. Finance/business professionals had a more favorable opinion of finance’s impact on the business than BI/IT professionals did.
The Role of BI Teams. To deliver a single version of truth, organizations rely on BI teams to collect and integrate data from multiple financial and other systems and make it available to users via self-service reports, dashboards, or analytical tools, including Excel. These self-service tools liberate finance and business users from having to request custom reports or views of data from the IT department and allow users to get the data they want when they want it.

Ideally, the BI team consolidates the integrated, cleansed data in an enterprise data warehouse and subject-specific data marts that contain all the subject areas users want to explore down to transaction-level data. In reality, the data warehousing environment rarely contains all the data that finance and business users need, so the BI team needs to provide BI tools that let users query various data sources directly and combine the results in reports, dashboards, or spreadsheets.

The Upshot. With consistent, integrated data and self-service reporting and analysis tools, a finance department can spend the majority of its time analyzing data and advising the business instead of collecting, compiling, and massaging data. Mirroring the scenarios described earlier, a comprehensive BI environment allows:

- Financial analysts to spend less time producing standard financial reports and more time analyzing the root causes of performance anomalies and working proactively with the business to fix or avert problems.
- Financial managers to spend less time collecting financial and operational data and more time modeling scenarios and forecasting results to assist with major decisions about investments, product development, and staffing.
- Executives to avoid surprises at the end of the quarter because they can track daily performance at every level, enabling them to work proactively with the business to shore up areas of weakness before the end of the next financial period.
- Business executives to understand the profitability of every customer, product, and process on a daily basis and make major strategic decisions with confidence using facts and not just intuition.
- Business executives to avoid embarrassing audits or costly penalties for failing to apply adequate controls to financial reports and delivering accurate data to financial stakeholders.

Office Depot. Many financial departments are now beginning to reap some, if not all, of these benefits. For example, Office Depot has constructed an enterprise data warehouse that aligns financial and product data at a detailed level. By merging financial and product hierarchies and data, Office Depot now has a common language that enables finance and merchandisers to communicate about product profitability and figure out ways to improve it.

In the company’s copy and print center, financial analysts using a variety of BI tools noticed that black-and-white copiers weren’t generating as much profit as color copiers, and they worked with the business managers to shift their inventory to color copiers. In another instance, financial managers noticed pricing discounts were edging higher than expected in several locations and notified business managers who took action.

“In the past, finance had its profit/loss statement and merchandising had its sales and gross margin reports by product, but the two weren’t connected,” says James Hoganson, director of sales accounting and reporting at Office Depot. “Now, both groups can see the profitability of individual products on a daily basis, which has enabled the business to change its strategies more quickly.”

Recommendations

Business intelligence can empower the CFO and finance department in their quest to better serve the business. When implemented properly, BI can provide timely insights, which the finance department can use to help business managers make better strategic and tactical decisions that lead to better financial results.

To empower the CFO with BI, we recommend the following:

1. Get a sponsor, find and understand the pain.
   Implementing BI is an exercise in change management. To succeed, you need an executive sponsor and a chief lieutenant to drive requisite changes and sustain the initiative for several years until it reaps dividends. The best candidates are sponsors who suffer from a lack of visibility into strategic and operational performance and who are willing to certify and use the reports the new environment will generate.

2. Partner with the BI team.
   The BI team is responsible for delivering clean, consistent financial data, applying appropriate rules and adjustments, and integrating that data with operational data from non-financial systems. But the BI team cannot perform this work alone. It needs to work closely with subject matter experts in the finance department who understand financial rules and processes and can interpret the data for the BI team. This requires a tight partnership between the finance and BI teams in which each respects what the other does and understands the problems each encounters along the way. To achieve this partnership, executives often assign finance experts to serve on the BI project team and BI managers often recruit tech-savvy financial analysts to work full time in their departments.
3. Homogenize the general ledger and chart of accounts. To meet the needs of the finance department, it helps to consolidate all general ledgers onto a single platform and harmonize the chart of accounts throughout the organization. This is a major undertaking, but it greatly reduces the tedious integration work that can slow down data warehouse deployments (or that requires a boatload of accountants if done manually). When organizational structures make such standardization impossible, companies should use financial consolidation tools to harmonize the financial data. In addition, the data warehouse can serve as the single point of integration while a company is migrating to a new global general ledger system.

4. Build an enterprise data warehouse. To deliver the single version of truth desired by the CFO and other executives, the BI team should design the data warehouse to be enterprise in scope, linking operational data with financial data. This enables users to shift from a financial view of the business to a transactional view to see what’s driving the numbers, and vice versa. It’s important to remember that an enterprise data warehouse is built in small steps, one logical data mart at a time, each providing business value. This process requires visionary sponsors willing to sustain their commitment and funding over years.

5. Deliver self-service BI tools. Executives, managers, and other financial staff must be able to access data directly without IT involvement. This requires the BI team to implement self-service BI tools that make it easy for users to drill from summary level views to detailed data without getting lost, and to preserve views by scheduling them as regular reports. These reports should be able to pull data from multiple locations so users can view critical information in one place with one tool instead of hunting around for data using multiple software products.

6. Deliver timely, detailed data. Reports that only contain summarized views of financial and operational data are virtually useless to financial managers and analysts. To get to the root of a problem or issue, financial managers and analysts need to view details and filter data by different dimensions. They also need to see the freshest data possible so they can identify issues, analyze options, and work with the business to take action before the problem shows up on the bottom line. BI teams need to architect the data warehouse to provide timely data and/or offer robust BI tools that can federate data from multiple locations in real time.

7. Coexist with Excel. Although financial managers and analysts are comfortable using Excel, most do not understand its limitations as a data management system. To enjoy the benefits of Excel without experiencing the drawbacks, use Excel as a client to BI servers that manage the data in a consistent way via the data warehouse. It’s also important to prohibit the use of Excel-based reports that conflict with CFO-certified reports generated from the data warehouse, to prevent users from publishing their own reports to a shared server or portal without permission.

8. Create an ad hoc environment for financial analysts. To perform ad hoc analyses, financial analysts must combine data from multiple systems, including the data warehouse. The analytical environment must be flexible enough to allow them to apply sophisticated transformations and calculations. Excel is the default ad hoc analytical tool of choice for financial analysts. But BI teams should consider exposing the analysts to other tools that extend the scope and scale of their analyses. This would include predictive analytic tools that model patterns in large volumes of data; visual discovery tools that let users interact with data visually at the speed of thought; and analytic sandboxes that reserve a partition of the data warehouse for users to combine and merge data warehouse data with their own.

9. Leverage the data warehouse to support other financial applications. A data warehouse is more than a reporting vehicle. It is a corporate resource of integrated data that can support a multitude of analytic applications either directly or through a series of logical data marts. These include planning and budgeting applications, performance management applications such as dashboards and scorecards, and profitability and risk management applications.

Wayne Eckerson has been a thought leader in the data warehousing, business intelligence, and performance management fields since 1995. He is the author of the best-selling book Performance Dashboards: Measuring, Monitoring, and Managing Your Business, second edition (John Wiley & Sons, 2010). Wayne is the former director of education and research at TDWI, and currently director of research at TechTarget and president of BI Leader Consulting. He can be reached at weckerson@techtarget.com.
BI on a Limited Budget

Key Strategies

The tight budgets and lean staffs of the past two years have forced BI teams to devise innovative ways to get things done. The recession has made BI teams leaner, yet more efficient. Most have by now made an art out of doing “more with less.”

Most Popular Strategies. We asked survey respondents to rate the business value of various approaches to getting more mileage out of their BI budgets and teams (see Figure 1). More than 50% of respondents rated 14 strategies as either “very high” or “high” in business value. More than one-quarter of respondents gave the same rating to another 14 strategies. This huge list shows the lengths to which BI teams have gone in their quest to do more with less.

The top two strategies are “implement self-service BI” (66%) and “implement a BI competency center” (66%), followed closely by “cultivate a network of super users in each department” (65%) and “create small, cross-functional BI teams” (65%). Other strategies rated highly by 60% or more of respondents include: “use existing tool rather than purchase a new one” (63%), “reduce number of spreadmarts” (62%), “apply agile or spiral development techniques” (62%), “consolidate data marts” (61%), and “consolidate BI tools” (60%).
Strategies rated “very high” or “high” by at least 50% of the respondents are: “have a vendor conduct a proof of concept” (59%), “minimize project scope” (54%), “renegotiate license/maintenance fees” (54%), “co-locate developers and business analysts” (51%), and “partner with a vendor for a total solution” (50%).

**Very High Value.** If we examine “very high” ratings alone, we see a few strategies bubble to the top. These are strategies that respondents feel offer the biggest bang for the buck. The two most valuable strategies are “consolidate data marts” (46%) and “implement self-service BI” (42%). They were followed by “implement open source” (38%), “consolidate BI tools” (38%), and “minimize project scope” (37%). We will discuss these strategies in detail later.

There were also a few techniques that earned significant “very high” scores but few “high” scores. This suggests that the strategies proved very valuable for a small number of organizations, but were not widely implemented. For instance, this appears to be the case with “deploy BI solution in the cloud,” where more than three times as many respondents (24%) rated it as “very high” compared to “high” (7%). The same holds true to a lesser degree for “deploy packaged BI solution” (26% versus 9%, respectively), “implement a data warehousing appliance” (29% versus 14%), “implement an open source solution” (38% versus 10%), and “host BI server offsite” (29% versus 14%).

Since most of these strategies involve using newer technologies that have yet to enter the mainstream, this gap between “very high” and “high” scores is not surprising. The good news is that these new technologies—cloud, appliances, packaged solutions, and open source BI—offer significant value for companies that adopt them.

**Lesser Value.** There were a few strategies that got less endorsement from BI professionals than expected, such as hiring offshore developers and contractors. While nearly a quarter of respondents rated the value of these strategies as “very high” or “high,” they still were at the bottom of the high-value list.

One former BI analyst who now works at a software company told me that “offshoring has lost its luster.” Many companies are pulling development work back onshore as they discover the hidden costs of offshoring and as salaries in India and other offshore markets rise. Yet, offshoring still makes sense for many companies, especially if they have people who are experienced in managing offshore relationships and have developed processes to ensure efficient and effective communications.
Replacement Technology

Many BI managers are replacing expensive BI tools with lower-cost ones. Figure 2 lists categories of BI tools by the degree to which organizations have replaced them with lower-cost alternatives or plan to replace them in the future. Dashboards, surprisingly, top the charts with a 75% combined score, followed by ETL tools (71%), ad hoc reporting tools (70%), and standard reporting tools (69%). These are very high rates of replacement.

Except for dashboards, each of these BI technologies is fairly mature, and many organizations want to upgrade to the latest generation of tools. With dashboards, many companies are replacing homegrown solutions with dashboard-specific products.

Future Replacements. In addition, a number of tool categories will be replaced at an accelerated rate in the next three years. For example, the replacement rate for scorecard, data quality, data mining, and exploration tools will more than double in the next three years, while replacement for integrated BI suites and data integration suites will increase by 50% or more. As with dashboards, these higher replacement rates reflect the advent of newer technologies as well as renewed interest in these BI niches. Many companies are currently using homegrown tools or none at all, or haven’t established an enterprise standard in these categories. This growth rate reflects early adoption by these types of companies.

In which tool categories have you replaced an incumbent tool with a less expensive one in the past several years, or will you likely replace an incumbent tool in the next three years?

<table>
<thead>
<tr>
<th>Tool Category</th>
<th>Past three years</th>
<th>Next three years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dashboard</td>
<td>33%</td>
<td>42%</td>
</tr>
<tr>
<td>ETL</td>
<td>34%</td>
<td>37%</td>
</tr>
<tr>
<td>Ad hoc reporting</td>
<td>35%</td>
<td>34%</td>
</tr>
<tr>
<td>Standard reporting</td>
<td>33%</td>
<td>36%</td>
</tr>
<tr>
<td>Integrated BI suite</td>
<td>33%</td>
<td>36%</td>
</tr>
<tr>
<td>Database</td>
<td>20%</td>
<td>28%</td>
</tr>
<tr>
<td>OLAP</td>
<td>22%</td>
<td>24%</td>
</tr>
<tr>
<td>Scorecard</td>
<td>13%</td>
<td>19%</td>
</tr>
<tr>
<td>Data quality</td>
<td>12%</td>
<td>25%</td>
</tr>
<tr>
<td>Data mining</td>
<td>7%</td>
<td>26%</td>
</tr>
<tr>
<td>Data integration suite</td>
<td>12%</td>
<td>15%</td>
</tr>
<tr>
<td>Exploration</td>
<td>43%</td>
<td>35%</td>
</tr>
</tbody>
</table>

Figure 2. Based on 212 respondents.

Small and Midsize Companies

Of course, tight or nonexistent budgets and staffs are par for the course at many small and midsize companies. The recession didn’t change much in the dynamics of how they deliver BI solutions.

For instance, Gazelle.com is a 100-person start-up with 40 BI users spread across the sales, customer care, marketing, operations, and finance departments. For the combination of low cost, convenience, and scalability, the company runs its entire IT infrastructure in the public cloud, including its data warehouse—which is an open source database (MySQL)—and its BI tool.

“Our total BI cost is basically my salary plus a relatively small, monthly Amazon server rental charge and a small yearly BI subscription fee. In other words, less than six figures,” says Tom Russell, senior BI developer at Gazelle.com, which is an online electronics resale and recycling service.

Russell isn’t alone in his quest to deliver BI on a shoestring budget. More than a quarter of our respondents (26%) work at companies with less than $100 million in revenues, and another 14% have less than $500 million in revenues. At a small company, there often isn’t a formal BI program, which is the case for 22% of our respondents. About one-quarter spend less than $50,000 a year on BI maintenance, and about one-third spend less than $100,000 a year. About one-quarter (26%) have fewer than two full-time equivalent staff.

Fortunately, small and midsize companies (SMBs) have many options for delivering BI without breaking the bank. Vendors offer a panoply of low-cost options, from open source tools (reporting, OLAP, databases, ETL, and predictive analytics) and cloud-based BI services to low-cost, departmental BI suites and data warehousing appliances. Despite the tough conditions of a recession, most companies can now afford to deliver BI solutions.

Wayne Eckerson has been a thought leader in the data warehousing, business intelligence, and performance management fields since 1995. He is the author of the best-selling book Performance Dashboards: Measuring, Monitoring, and Managing Your Business, second edition (John Wiley & Sons, 2010). Wayne is the former director of education and research at TDWI, and currently director of research at TechTarget and president of BI Leader Consulting. He can be reached at weckerson@techtarget.com.

This article was excerpted from the full, 28-page report, BI on a Limited Budget: Strategies for Doing More with Less. You can download this and other TDWI Research free at tdwi.org/research/list/tdwi-best-practices-reports.

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Mistakes to Avoid
When Driving BI Adoption and Managing Change

BY TONY LOPYKINSKI

FOREWORD
Organizations struggle with many issues that inhibit their ability to achieve long-term business intelligence (BI) success. Although technology often plays a key role, it’s the nontechnical elements—people, process, politics, and corporate culture—that pose the greatest threat and can sabotage even the best-intended BI efforts.

A successful BI program should not be judged solely on an organization’s ability to develop and deploy a solution on time and within budget. Successful BI should be measured by the value and direct business impact it brings to the organization through its adoption and use by key stakeholders. After all, BI is about making information readily available to provide new insights, enable fact-based decisions, and improve actions.

Organizations must address the human side of BI to drive awareness, increase adoption, and create sustainable momentum that delivers the greatest long-term value from their BI capabilities.

Failing to Build the Need for BI Within Your Organization
Too often, BI initiatives are pushed to the organization without a clear understanding of their value or purpose. These initiatives are usually well intended; however, they repeatedly fail to address real business drivers, and they don’t create a sustainable impact on the organization. Many of these efforts are grown and driven within the organization’s IT department, where the thinking is that data and technology will solve all of the business’s challenges. Other initiatives surface as specific functional projects that lack the capability to serve the enterprise. In either case, groups rarely spend sufficient time analyzing and building the demand necessary for BI initiatives to succeed.

Build your case for BI by first assessing the effectiveness of current efforts. Paint a balanced perspective that starts by highlighting what’s working. This approach will help maintain positive morale, protect the self-worth of those involved, build credibility, and reduce resistance.

Next, identify your organization’s business information risks and challenges, such as data integrity, lack of standards/measurements, disparate systems, duplicate costs, and so on. Focus on the business issues that BI can help solve, such as reducing costs and increasing operational efficiency.

You can then begin to present this information to your organization. You may choose to use a consulting firm to perform an objective assessment or further validate the possibilities BI can bring to your business. Educating leaders about how your competitors are using BI or taking your leaders along to benchmark other organizations are also great techniques for building the case for BI. No matter what your final approach is, always focus on the business value rather than on the technology.
Failing to recognize and address resistance to your BI initiative

As fast as momentum can build from generating a real business need for your BI initiative, internal resistance can just as quickly bring that positive momentum to a grinding halt. How do you deal with the resistance that comes with leading a BI initiative? One approach is to ignore it. Another is to drive BI into your organization, running over anyone and anything that gets in your way. Although both approaches can be tempting, neither will help you truly address change management issues. As a change agent, you must recognize and leverage resistance to help plan for—and proactively manage—change.

To understand how to embrace resistance, recognize the beliefs and causes that contribute to it. Stakeholders resist change because they:

• Believe the change isn’t consistent with policies and procedures
• Don’t understand why they need to change
• Feel the change is poorly planned and communicated
• Believe management is not serious about change
• Believe they are already drowning in change
• Have experienced too many past failures
• Need to protect their sense of self-worth
• Think BI is a terrible idea

Leaders of BI initiatives may wrongly believe that good managers can eliminate resistance, that people who resist are disloyal, or that resistance has no real value. As a change agent, you must see through these myths and educate your leaders. You must also strive to avoid believing these myths yourself. Recognize your own resistance and adopt the changes you are imposing on your organization. Be patient with colleagues. Change and resistance happen at the individual level, and people move at their own pace.

Do not try to build the perfect solution. Instead, stay focused on incrementally building positive momentum. Finally, do not be misled by employees who say everything is fine.

Avoiding these traps will keep you from being surprised by resistance while enabling you to embrace resistance to drive change.

Lack of a vision and strategy for your BI initiative

Many organizations still approach BI one project at a time with no clear vision. Lack of a good BI vision and strategy inhibits your ability to focus your investments and resources, and it makes driving change and BI adoption more difficult.

A good BI vision serves three important functions: it defines a future-state direction, it motivates people to take action, and it more efficiently coordinates the actions of different people. An effective BI vision depicts a “top-down” future-state view that is aligned with your organization’s overall business strategy. After all, what’s important to your company is important to BI. By supporting an existing strategy, you are also more likely to receive executive support—and funding.

Your BI strategy should answer three key questions. Where are we? Where do we want to be? How do we get there? The BI strategy must address the prioritized business capabilities, the enablers necessary to build and sustain your BI program, and the governance to manage program execution and provide oversight. As for enablers, every strategy should define the information architecture, technology, people, processes, and change management/communications required to achieve the vision. Many BI programs touch on the first four of these enablers. However, few initiatives include change management and communications in the up-front and ongoing planning process. Unfortunately, if you wait until the implementation
phase of your first BI release, you’ve missed the opportunity to proactively deal with most of the change management issues that can derail your BI program.

**NOT INCORPORATING A COMMUNICATIONS PLAN INTO YOUR BI PROGRAM**

A communication strategy enables you to effectively communicate your BI vision. When creating your communication plan, it’s important to address key messages early and reinforce them throughout the entire program. Remember, making a change is a personal choice, so communication must resonate with the individual. To be effective, you must connect with individual employees’ beliefs and values by providing a compelling case for how business intelligence will positively affect them. Resist the urge to have communications come from the BI team or project leaders. Employees prefer to hear messages from senior business leaders, immediate supervisors, and peers. Prepare these communicators to deliver effectively by reviewing key messages, training communicators on delivery, ensuring alignment and consistency between senders, and preparing for questions.

Use appropriate channels and techniques to reach employees, such as group meetings, brown-bag lunches, newsletters, the company intranet, and testimonials. Identify what in your organization is working and acceptable within your corporate culture. When in doubt, leverage face-to-face communication methods wherever possible and create opportunities for two-way communications, allowing employees to share concerns, provide feedback, and ask questions in real time.

No matter how you choose to communicate, keep it simple by removing all jargon, acronyms, and technical terms. Repeat key messages often to ensure that the message you want to get across is heard and understood by employees. Use assessment tools and metrics to measure message saturation, diagnose problems, and apply corrective actions.

Finally, make certain you, your team, sponsors, and champions all lead by example. Nothing will destroy your communications efforts faster than actions that contradict your key messages.

**OVERLOOKING THE DEVELOPMENT OF GOVERNANCE AND BI PROGRAM OVERSIGHT**

The primary purpose of BI governance is to ensure the program aligns with the organization’s overall vision and business strategy. Business intelligence projects should be viewed as opportunities to improve the business and be prioritized to ensure optimum business benefit is obtained from the BI investment. BI governance also:

- Facilitates collaboration between IT and business
- Balances business requirements with IT’s ability to deliver
- Enables program-level budgeting and planning
- Addresses issue management and risk mitigation
- Ensures standards and processes adherence
- Provides a cross-functional perspective
- Focuses on delivering long-term, sustainable value
- Enables consistent communication of progress and decisions
- Ensures user commitment and adoption

An effective BI governance process requires people, policies, and procedures to be defined. BI governance groups must have the authority to make and enforce a myriad of decisions on a variety of topics. Their decision-making ability is enabled through the development of processes, tools, and service-level agreements that provide structure and focus accountability.

BI governance must strike the right balance of process complexity, oversight, and control. A governance structure that is too constrictive will alienate business stakeholders from adopting and using your BI solution. The BI governance process should be simple so people can easily understand and follow the process. Keep the project request template straightforward, communicate the right tone, and ensure that everyone involved understands that governance processes are critical to the success of the BI program as a whole. Take away complexity and eliminate the excuses that will inhibit the adoption of a strong BI governance solution.

**FAILING TO ORGANIZE FOR BI**

Driving positive change through BI requires you to evaluate your organizational structure. Many organizations that successfully implement BI programs establish BI competency centers (BICC) to:

- Help executives understand BI’s value
- Ensure BI deliverables are aligned with overall business strategy and objectives
- Reduce analytical redundancy
- Define and document BI best practices
- Develop templates and tools to facilitate requirements gathering, development, testing, and other processes
- Build and facilitate the BI training program
- Facilitate communication across the business and IT organizations
- Govern data and BI technology tool standards
The role of the BICC varies by organization from "oversight only" to "full-service BI delivery." For the BICC to successfully enable change, it must have a clearly defined purpose and appropriate authority. It is imperative that a strong formal governance program be established prior to defining the role and granting the necessary authority to the BICC.

The BICC is a competency-based model and individual roles may span multiple competencies during its early stages. For this reason, roles and responsibilities should be clearly defined and communicated to all stakeholders. The final structure and operating model should be designed with consideration for the organization’s culture, political environment, and current IT/business relationship. It should evolve as demand requires, budget allows, and organizational change permits.

Training users about your BI solution is one of the most important elements for change. For this reason, you should formalize your BI training program by including it as a component of your BI strategy and providing oversight through your BI governance board.

When developing a formal BI training program, begin by categorizing the users of your solution. Categorizing users helps you better understand requirement differences for information use and consumption, BI delivery tools, and training. Most organizations have at least three to five different BI user profile groups.

Once you identify your users, create a formal curriculum for each of the identified user profiles in your organization. While the governance board needs to make training a prerequisite to user provisioning, the BICC should own the training content and provide oversight for its delivery. Initial training should focus on the proper use of data and business metrics leveraging the BI tool’s functions.

Consider a “train-the-trainer” approach and leverage business champions to serve as trainers throughout your organization. Utilizing business champions enables:

- Better cost and time management (having the core BICC team deliver onsite training in geographically dispersed organizations could be too costly)
- A stronger focus on the proper business use of data, reports, and analytics
- Addressing business issues and questions in real time
- Better advocacy of the BI solution and more effective change management

Providing short-term wins through incremental BI delivery has many benefits for building and sustaining the momentum to drive change. Short-term wins reward stakeholders for their hard work by providing positive feedback that builds morale. They also undermine critics and resisters, since clear improvements in performance make it difficult for people to block positive change. Most important, they keep sponsors on board by providing evidence to leadership that your BI program provides tangible, short-term business value.

What constitutes a short-term win? First, business results must be visible to large numbers of people within the organization. The deliverables must be explicit and clear-cut so that no one can challenge the outcomes. Finally, wins need to be clearly identified with the BI program and not be attributable to anything else. Initial wins should be achieved in fewer than six months, with ongoing wins every 30–90 days.

The success of your first BI project will be critical in setting the stage for the long-term, sustainable growth of your larger BI program. This makes the decision process as to which BI project to take on first all the more important. The main objective of your initial planning process should focus on identifying the “killer BI app” by targeting projects with:

- High visibility across the organization
- Strong strategic alignment and business impact
- Strong sponsorship
- High-quality data sources
- Significant opportunity to integrate future data
- High probability to deliver
- Minimal impact to legacy reporting solutions
- Low to moderate levels of training
- High stakeholder readiness assessment scores

Gaining and maintaining momentum for your BI program can be a daunting task for many reasons, including corporate culture, changes in leadership, and demands for budget dollars. You must continue to deliver value, market your solution, sell your successes, and recognize those who helped achieve them. Keeping positive momentum will enable demand for more change, encourage adoption, and increase ongoing investment in the BI program.

How do you sell your BI success? Use testimonials whenever possible from executives, influential stakeholders, and business champions. Bring your satisfied customers to meetings.
with executives and prospective stakeholders to speak and address questions. Be sure to balance success stories between tangible benefits (e.g., direct business value, cost savings, and new capabilities) and intangible benefits (e.g., better quality of information and more timely decision making).

Recognizing your stakeholders’ and BI staff’s contributions is another great secret to market the success of your BI program. Creating formal recognition programs reinforces the desired new behaviors of BI, demonstrates leadership’s continued support, enhances people’s self-worth, and creates a culture that fosters innovation. Celebrating individual project completion and other key milestones also rewards and motivates your BICC staff.

- Consider branding your BI program to:
  - Provide a single identity when communicating
  - Simplify marketing a complex product
  - Differentiate your product from others
  - Reinforce the data and analytic integrity of your BI program
  - Create a “rippling” adoption effect

Avoiding these 10 mistakes is hard work, but the effort is worth it. Focusing on the human side of BI will significantly increase the likelihood of adoption success, helping you deliver long-term, sustainable business value to your organization.

Tony Lopykinski is the managing principal of Maven Advisors, LLC (www.maven-advisors.com), a management and technology consultancy specializing in business intelligence and data warehousing services to help organizations achieve their business objectives through the integration, management, and delivery of information. Tony has more than 18 years of leadership experience, having served in numerous roles within the analytics and BI/DW space. Contact him at tlopykinski@maven-advisors.com.
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Advocates wanting to sell a business intelligence (BI) initiative to the executives who fund it should be aware of a new development in IT called software-as-a-service (SaaS), also known as "on demand." A fundamental element of the SaaS approach is that subscription-based pricing (e.g., $200 per user per month) makes costs transparent.

The emergence of SaaS matters to those in BI because it has conditioned executives to expect to know in advance what an application will cost. Therefore, it will serve us well to understand and make as transparent as possible the cost of legacy manual/spreadsheet-based reporting and analysis approaches and the cost of replacing them with professionally designed and developed BI applications so we can communicate a complete and compelling value proposition for BI.
A good place to start in a quest for understanding costs is the current way of doing things. As we all know, the most widely used BI tool is Microsoft Excel. No matter what we call it—"manalytics," "spreadmarts," "shadow IT," or something else completely—it’s a ubiquitous approach to reporting and analysis in which users perform the work themselves with spreadsheets. The risks of using spreadsheets—they’re error-prone, unrepeatable, untraceable, and unauditable—have been well documented, so we need not discuss them here.

An aspect of spreadsheet-centric reporting and analysis that we do need to consider is its cost. Many organizations do not know their manual/spreadsheet-based reporting and analysis costs. In a recent survey we conducted for a research paper about business performance management (BPM) and BI alignment, we asked respondents with manual and/or spreadsheet-based BPM processes what their annual cost is. The most common answer, given by 45 of 121 respondents (37.2 percent) was “Don’t know.”

Some organizations do know what it costs, and the answer is a lot! One of our consulting clients used a Balanced Scorecard framework for performance management. Scorecards were updated monthly using a manual and spreadsheet-based process. The client calculated that the staff effort to generate its monthly performance scorecards cost $2 million per year!

Not understanding current costs impedes the development of a business case for investment in BI. The best and most inspiring justification for investing in BI is the business value of better information and more effective decision making, but it is also the most difficult to quantify. Replacing legacy manual processes and thereby reducing or eliminating the costs associated with them can seldom be the sole justification for a BI project, but it is more easily quantified than potential benefits and needs to be included in the business case.

It also is common for organizations to not know the cost of their BI and data warehousing (DW) software tools. A recent consulting client that used multiple BI tools wanted to standardize on only one. When we asked, “How many licenses do you have for each BI tool, how much was the initial licensing fee, and what is the cost of ongoing maintenance and support from the vendor?” the client had no idea. Given that one of the justifications for standardization was the elimination of redundant maintenance and support costs, not knowing those costs made constructing a compelling argument for standardization more difficult.

**NOT UNDERSTANDING CURRENT COSTS IMPEDES THE DEVELOPMENT OF A BUSINESS CASE FOR INVESTMENT IN BI.**

Some elements of the BI/DW infrastructure (virtualized servers, SANs, and the communications network, for example) are commonly shared across BI and other applications, making the portion of their cost attributable to BI difficult to determine. However, the cost of other elements of a BI program—dedicated infrastructure, dedicated BI staff, and BI/DW software maintenance, among others—can and should be known. Return on investment (ROI) is a function of benefits and costs; to understand the ROI from BI, we must know its costs.

Before we can attend to the technical aspects of BI, we first must address the business aspects, beginning with the costs we will eliminate (manual/spreadsheet-based reporting and analysis) and the costs we will incur (building and operating the BI application). Executives expect, and deserve, no less from us.

Bill Collins is director of business solutions for DecisionPath Consulting, which specializes in business intelligence, analytics, data warehousing, and performance management solutions. Contact Bill at 301.990.1661.
Patrick Lencioni’s best-selling book, *The Five Dysfunctions of a Team* (Jossey-Bass, 2002), contrasts the characteristics of dysfunctional and healthy teams. It is an easy-to-understand model that reflects our experiences with business intelligence (BI) teams over the last 18 years.

We frequently hear that BI initiatives fail because they did not deliver results. Many companies attribute this to tools, technical skills, architecture, business changes, or inadequate personnel, but Lencioni’s model illustrates that a lack of results is frequently the outcome of a different set of underlying problems, starting with a lack of accountability, which, he writes, is caused by lack of commitment. Lack of commitment is caused by fear of conflict, and fear of conflict is caused by lack of trust.

If your team is not achieving results, it is worth your time to examine the pyramid of a dysfunctional team. In this model, the failure to deliver results originates from an unstable foundation created by a lack of trust.
<table>
<thead>
<tr>
<th>DYSFUNCTIONAL BI TEAM</th>
<th>FUNCTIONAL BI TEAM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lack of Trust</strong></td>
<td><strong>Trust</strong></td>
</tr>
<tr>
<td>Hide mistakes</td>
<td>Own their mistakes</td>
</tr>
<tr>
<td>Avoid each other</td>
<td>Spend time together</td>
</tr>
<tr>
<td>Don’t ask for help</td>
<td>Ask for help</td>
</tr>
<tr>
<td>Don’t provide feedback</td>
<td>Provide constructive feedback</td>
</tr>
<tr>
<td>Conceal weaknesses</td>
<td>Acknowledge weaknesses</td>
</tr>
<tr>
<td><strong>Lack of Conflict</strong></td>
<td><strong>Constructive Conflict</strong></td>
</tr>
<tr>
<td>Team meetings are rote</td>
<td>Team meetings are engaging</td>
</tr>
<tr>
<td>Triangulation and gossip permitted</td>
<td>Have direct conversations</td>
</tr>
<tr>
<td>Personal attacks tolerated</td>
<td>Don’t engage in personal attacks</td>
</tr>
<tr>
<td>Avoid controversy</td>
<td>Discuss ideas from multiple perspectives</td>
</tr>
<tr>
<td>Individual posturing</td>
<td>Solve problems</td>
</tr>
<tr>
<td>Submerge differences</td>
<td>Leverage and encourage differences</td>
</tr>
<tr>
<td><strong>Lack of Commitment</strong></td>
<td><strong>Committed</strong></td>
</tr>
<tr>
<td>Lack of clear direction</td>
<td>Clear direction and priorities</td>
</tr>
<tr>
<td>Too many priorities</td>
<td>Alignment around goals and objectives</td>
</tr>
<tr>
<td>Analysis paralysis</td>
<td>Learning attitude</td>
</tr>
<tr>
<td>Lack of confidence</td>
<td>Move forward with confidence</td>
</tr>
<tr>
<td>Fear</td>
<td>Make decisions</td>
</tr>
<tr>
<td>Revisit same issues multiple times</td>
<td>Support decisions</td>
</tr>
<tr>
<td>Second-guess each other</td>
<td>Change direction as needed</td>
</tr>
<tr>
<td>Excuses and delays</td>
<td><strong>Accountable</strong></td>
</tr>
<tr>
<td><strong>Lack of Accountability</strong></td>
<td>Adheres to mutually agreed-upon deadlines</td>
</tr>
<tr>
<td>Missed deadlines</td>
<td>Individual ownership</td>
</tr>
<tr>
<td>Finger-pointing</td>
<td>Peer pressure to perform</td>
</tr>
<tr>
<td>Lack of peer pressure</td>
<td>Contribution from all team members</td>
</tr>
<tr>
<td>Heroes and slackers</td>
<td>Delegation and follow-through</td>
</tr>
<tr>
<td>Leadership overload</td>
<td>Earn achievements</td>
</tr>
<tr>
<td>Entitlement</td>
<td>Clear assignments and agreements</td>
</tr>
<tr>
<td>Resentment</td>
<td>Consequences for success/failure</td>
</tr>
<tr>
<td><strong>Lack of Results</strong></td>
<td><strong>Results</strong></td>
</tr>
<tr>
<td>Does not deliver scope</td>
<td>Deliver on time, within budget</td>
</tr>
<tr>
<td>Late delivery</td>
<td>Customer focused</td>
</tr>
<tr>
<td>Over budget</td>
<td>Incremental success</td>
</tr>
<tr>
<td>Loses funding</td>
<td>Increased visibility</td>
</tr>
<tr>
<td>Loses achievement-oriented employees</td>
<td>Retains achievement-oriented employees</td>
</tr>
<tr>
<td>Distracted</td>
<td>Focused</td>
</tr>
<tr>
<td>Customer dissatisfaction</td>
<td>Customer engagement and satisfaction</td>
</tr>
</tbody>
</table>

*Source: The Five Dysfunctions of a Team* by Patrick Lencioni (Jossey-Bass, 2002)
Lack of Trust
The word trust is often misunderstood and misused. Trust is the belief among team members that their peers’ intentions are positive. It’s possible to be honest about weaknesses, deficiencies, shortcomings, and mistakes without spending energy managing appearances and interactions. If teams trust each other in this context, it is more conducive to disagree.

Lack of Conflict
Conflict, in this instance, does not mean destructive fighting, attacks, or unproductive politics. If we want to produce the best BI solutions, there must be healthy debate in which people can disagree. We must quickly come to a resolution so we can move forward without residual damage. When conflict is stifled, people turn to triangulation and continually revisit issues. If teams can have a constructive debate where all viewpoints are heard, and then agree to move forward, they can buy in even if some disagree with the decision.

Lack of Commitment
The two biggest obstacles to commitment are ambiguity and consensus. Although there are circumstances in which consensus may be appropriate, always trying to achieve consensus can be time-consuming and produce mediocre solutions. Great BI teams commit to clear courses of action, sometimes with incomplete information, and support decisions once they are made. Clear deadlines and dates are key to promoting accountability.

Lack of Accountability
Top-down management is not the most effective means of maintaining high standards on a team. Peer pressure is more efficient than policies or systems. The anxiety of letting down respected team members is a key performance motivator.

Lack of Results
Good BI teams specify what they plan to accomplish in a given period. They have an unrelenting focus on what they collectively want to achieve. Functional BI teams make the collective results of the group more important than each individual’s goals.

Your Team?
Is your BI team dysfunctional or functional? For a high-level diagnostic, read through the chart (previous page) and determine where to start. Is a lack of results really the fault of tools and technology, or is it something more basic in the pyramid?

REFERENCES

Maureen Clarry is the CEO of CONNECT: The Knowledge Network, a consulting firm that specializes in data, technical, and organizational solutions for business intelligence. She has been on the faculty of TDWI since 1998. Maureen can be reached at mclarry@connectknowledge.com or 303.730.7171, ext. 102.

This article appeared in TDWI FlashPoint e-newsletter August 5, 2010. TDWI FlashPoint is an exclusive TDWI Member benefit. For more information about TDWI Membership, visit tdwi.org/membership.
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Educating the Next-Generation BI Workforce

BY BARBARA H. WIXOM, HUGH J. WATSON, OLIVERA MARJANOVIC, AND THILINI ARIYACHANDRA

Abstract
A recent survey conducted to help answer common questions about teaching BI in colleges and universities found that BI is most frequently taught in MIS departments in business schools, either as part of a related course or as a standalone course. What is taught about BI depends on the academic discipline that offers the course, the course itself, the preferences of the instructor, and the needs of employers. A variety of BI resources are available for teaching BI, and vendors are now helpful in making their resources available, especially state-of-the-art software. Practitioners should become involved with colleges and universities to help shape BI education.

Teaching BI
Frequently we are asked how colleges and universities are teaching business intelligence (BI). These questions come from BI practitioners, vendors, and our own academic colleagues. In particular, we are asked:
• Is BI being taught in universities?
• What disciplines teach BI?
• What is being taught about BI?
• What is used to teach BI?
• Do universities offer specialized degrees or concentrations in BI?

This article describes our answers to these questions using insight gained by a recent survey on the current state of BI in academia as well as our own personal experiences. We also provide ideas for how you can help professors educate the next generation of BI managers and professionals.

A Survey of BI in Academia
In December 2009, the BI Congress in Phoenix, Arizona, brought together thought leaders from the practitioner, vendor, and academic communities to explore areas of emerging importance to the BI field, discuss the current state of BI in academia, and identify gaps in BI curriculum. The resulting knowledge would be used to inform educators how universities can best move forward in educating the next-generation BI workforce. We conducted a survey prior to the BI Congress to collect information from a wide variety of colleges and universities around the world. The questions about BI were based on what we have been asked over the years.

The survey was distributed to IT professors via academic listservs, and we received responses from 85 universities. The respondents represented many well-known universities (e.g., Arizona State University, ESADE Business School, National University of Singapore) located in several international regions (e.g., North America, Europe, Asia). The following sections provide observations based on the survey findings.

Is BI Being Taught in Universities?
Yes, although BI is predominantly offered as content within a related course or as a standalone course, not within a BI concentration or degree program. This is occurring at both the undergraduate and graduate levels; see Figure 1.

Although nine of the respondent universities recently launched new BI courses, and 15 others will likely follow suit, one professor explained, “It can be hard to get a new BI course approved as part of the entrenched curriculum.” Typically, when a new course is introduced, another course may be retired because of limited faculty resources and restrictions on the number of elective courses required in majors. Thus, that 28 percent of this sample of universities is actively working to carve out room for BI courses is a testament to the growing importance and popularity of the topic.

Universities often find it easier to embed BI within a related course, such as data management or introduction to IS, rather than create a new course. For example, data management professors may spend several class periods focusing on star schema data modeling, OLAP, or analytical SQL queries. Also, schools are increasingly incorporating one or two sessions of BI content within an introduction to information systems course. The sessions typically highlight how companies are delivering value through BI, demonstrate a BI tool, or leverage corporate speakers to share real-world examples of BI in action. Introduction to IS courses serve students across the business schools, so the more

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I am incredibly impressed by the eagerness with which my marketing and finance masters in commerce students embrace BI. At the University of Virginia McIntire School of Commerce, I teach these students a class called Strategy and Systems.

Several years ago, I simply exposed the students to a case study of a company creating business value through BI. Today, based on student demand, I also teach advanced SQL and OLAP tools. Last semester, several of them became so interested in BI that they have accepted offers at companies to begin careers in the field. It has been exciting to watch the evolution of BI acceptance and interest.

— Barb Wixom, University of Virginia

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Figure 1. Number of BI courses (based on 85 respondent universities)
these courses include BI, the more we raise BI awareness in non-IT business disciplines.

Do Universities Offer Specialized Degrees or Concentrations in BI?

As seen in Figure 1 and from our own experiences, few universities offer specialized degrees or concentrations in BI. The minority includes University of Denver, Universite de Sherbrooke, and North Carolina State University.

One program that offers degrees in BI is Saint Joseph’s University’s Erivan K. Haub School of Business in Philadelphia. It provides AACSB International-accredited programs in BI at both the undergraduate and graduate levels. A BI minor, a BI major, and an MS BI degree are offered by the school’s Decision & System Sciences Department. The graduate degree is available both on campus and online. The programs integrate elements of IT, statistics, and quantitative methods to prepare students to effectively apply and interpret analytics for improving evidence-based decision making in organizations.

What Disciplines Teach BI?

The majority (59 percent) of universities in our survey teach BI in business schools, usually within MIS departments. However, it is clear that students can also pick up BI skills in technical programs (e.g., computer science, systems engineering), non-IT business disciplines (such as marketing or accounting), and specialized departments (including supply chain, industrial engineering, and information science).

One professor noted in the survey that BI is "a good opportunity for cross-disciplinary applications and, thus, interdepartmental linkages." There is evidence that these linkages are emerging. For example, the University of Denver teaches its BI master's program out of three different academic departments: IT, marketing, and statistics. We believe this exciting trend can create well-skilled BI professionals.

What Is Being Taught about BI?

Professors interpret BI in different ways, which drives variation in what is taught in BI classes, but there are still broad patterns. Courses are typically shaped by the discipline offering the course. For example, an MIS department typically focuses on delivering skills for building BI applications, structuring data for BI, and using BI tools. A marketing department would focus on campaign management and customer analytics, and operations research departments would teach mathematical programming, simulation, and data mining/predictive analytics.

Additionally, differences between BI courses can stem from local differences in employer demands. For example, if local employers hire for strong SQL
### BI Course Information

<table>
<thead>
<tr>
<th>Professor: Thilini Ariyachandra</th>
</tr>
</thead>
<tbody>
<tr>
<td>University: Williams College of Business, Xavier University</td>
</tr>
<tr>
<td>Students: Undergraduate students</td>
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<tr>
<td>Course Format: Semester</td>
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<tr>
<td>Title: Business Intelligence</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Topics Covered</th>
</tr>
</thead>
<tbody>
<tr>
<td>BI concepts and components</td>
</tr>
<tr>
<td>BI infrastructure: development lifecycle, methodologies, data warehouse architectures</td>
</tr>
<tr>
<td>Enterprise data integration techniques</td>
</tr>
<tr>
<td>Data quality and MDM</td>
</tr>
<tr>
<td>Entity relationship modeling and SQL</td>
</tr>
<tr>
<td>Advanced dimensional modeling and OLAP cubes</td>
</tr>
<tr>
<td>Data visualization and analytics; dashboards and scorecards</td>
</tr>
<tr>
<td>Awareness and hands-on application of software in BI process: Teradata SQL</td>
</tr>
<tr>
<td>Assistant, Microsoft Analysis Services, Tableau, MicroStrategy</td>
</tr>
<tr>
<td>BI governance; strategies and issues affecting BI success/failure</td>
</tr>
<tr>
<td>Emerging trends in data warehousing/BI</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Instructor: Olivera Marjanovic</th>
</tr>
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<tbody>
<tr>
<td>University: Faculty of Economics and Business, University of Sydney</td>
</tr>
<tr>
<td>Students: Undergraduate and graduate business</td>
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<tr>
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<tr>
<td>Title: Business Intelligence</td>
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<table>
<thead>
<tr>
<th>Topics Covered</th>
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</thead>
<tbody>
<tr>
<td>BI in the enterprise context</td>
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<tr>
<td>Data quality and cross-functional data integration</td>
</tr>
<tr>
<td>Multidimensional data modeling</td>
</tr>
<tr>
<td>Designing BI systems (DLTPs, ETL, DW/DM; architectures; design methods)</td>
</tr>
<tr>
<td>BI tools and applications: reporting, OLAP, data mining, CRM</td>
</tr>
<tr>
<td>BI-enabled business performance management; scorecards/dashboards; data visualization</td>
</tr>
<tr>
<td>Strategic and operational BI; rule-based systems</td>
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<tr>
<td>Business process management and operational BI</td>
</tr>
<tr>
<td>Business issues (e.g., ethics)</td>
</tr>
<tr>
<td>Emerging trends and opportunities</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Professor: Hugh J. Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td>University: Terry College of Business, University of Georgia</td>
</tr>
<tr>
<td>Students: Undergraduate MIS majors</td>
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<td>Title: Business Intelligence</td>
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<table>
<thead>
<tr>
<th>Topics Covered</th>
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</thead>
<tbody>
<tr>
<td>Determining the business need</td>
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<tr>
<td>Gaining management support and resources</td>
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<tr>
<td>Assembling the BI team</td>
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<tr>
<td>Determining information requirements</td>
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<tr>
<td>Creating the data infrastructure: marts, warehouses, architectures</td>
</tr>
<tr>
<td>Data quality, metadata, and governance</td>
</tr>
<tr>
<td>Selecting BI software</td>
</tr>
<tr>
<td>Interface design</td>
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<tr>
<td>BI development methodologies: SDLC versus agile</td>
</tr>
<tr>
<td>BI applications: DSS, EIS, dashboards/scorecards, OLAP, CRM, predictive analytics, rules-based systems</td>
</tr>
<tr>
<td>Case studies: Harrah’s, First American Corporation, Continental Airlines</td>
</tr>
<tr>
<td>Software projects: MicroStrategy, Planners Lab, Tableau</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Professor: Barb Wixom</th>
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</thead>
<tbody>
<tr>
<td>University: University of Virginia, McIntire School of Commerce Program: Masters in the management of IT</td>
</tr>
<tr>
<td>Students: Executive graduate students</td>
</tr>
<tr>
<td>Course Format: Three 8-hour days</td>
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<table>
<thead>
<tr>
<th>Topics Covered</th>
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<tbody>
<tr>
<td>Enterprise data management</td>
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<td>Data quality</td>
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<tr>
<td>Metadata management</td>
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<tr>
<td>Data integration</td>
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<tr>
<td>Master data management</td>
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<tr>
<td>Data warehousing</td>
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<tr>
<td>BI readiness</td>
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<tr>
<td>Business intelligence tools and technologies</td>
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<tr>
<td>Business cases for BI</td>
</tr>
<tr>
<td>Global BI</td>
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<tr>
<td>Ethics</td>
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</tbody>
</table>

Table 1. Topics covered in various courses titled “Business Intelligence”
or data modeling skills, nearby universities are likely to have stronger content in those areas to meet those needs. In Table 1 (previous page), we share the content being taught in our own BI courses.

What Is Used to Teach BI?
The instructional resources used in BI courses vary with the course and the instructor’s preferences. Often a combination of textbooks, articles, cases, research reports, Web seminars, assignments, and software projects are used.

Several BI textbooks are available (e.g., Turban, Sharda, and Delen, Decision Support and Business Intelligence Systems, Prentice-Hall/ Pearson). Sometimes a professional and trade book is used instead. Although there are several high-quality academic BI journals (e.g., Decision Support Systems, International Journal of Business Intelligence Research), many of the best articles, cases, research reports, and Web seminars come from practitioner sources. TDWI, the BeyeNETWORK, and Information Management are excellent resources. TDWI offers a reduced Membership rate for students.

It is important for students to work with a variety of BI software. Although Excel is valuable and readily available, students need a wider range of experiences. For many years, BI vendors were hesitant to make their software available for free or at a heavy discount. This has changed significantly over the past 10 years. Vendors now see the advantages of students entering the workforce having worked with their products. Today, the “Big Four” enterprise systems vendors—IBM, Microsoft, Oracle, and SAP—have university programs that provide a variety of instructional resources. Perhaps most important, these companies provide access to their software.

The Teradata University Network (TUN) is a resource for BI courses that is used by 2,500 professors around the world (www.teradatauniversitynetwork.com). TUN is a free learning portal for faculty and students with an interest in BI, data warehousing, and databases. Teradata and other vendors, including MicroStrategy and SAS, sponsor TUN. The authors serve on its board and provide leadership, along with other academics, managers, and professionals from Teradata and other sponsor companies. The portal offers articles, case studies, student assignments and projects, and software. In terms of software, students can use Teradata SQL Web Assistant to develop their SQL skills, employ

MicroStrategy to experience reporting/OLAP and dashboards/scorecards, and download Tableau for data visualization. Pedagogical materials (e.g., tutorials, assignments, projects) are available to support the use of the software.

How Can You Become Involved in BI Education?
There are different reasons you might want to become involved in BI education. You may want to hire new graduates with BI skills. Perhaps you want to influence what is taught about BI. Another possibility is that you would enjoy interacting with BI faculty and students. Also, it is rewarding to share what you know about BI and to give something back to the field.

Before you become involved and influence BI education, there are several things you should know. First, as the survey data showed, BI is most commonly taught in MIS departments in business schools. That is where you need to focus your attention.

Second, get involved in departmental advisory boards. These boards review curriculum plans and provide valuable input that helps shape courses and content. They are one of the key mechanisms that align practice with university education.

Third, be specific about the skills you expect from students in your job postings. For example, if you explicitly require SQL proficiency, a working knowledge of specific database technologies, or data mining/predictive analytics knowledge, then students will seek out those skills and communicate those requirements to their professors.

TUN allows me to bring the exciting world of BI to my classroom, with access to free, state-of-the-art resources. My students are impressed by the wealth of resources and learning opportunities, and they often comment upon completion of their BI courses that they wish they could continue to use TUN in their own workplace. Most importantly, rather than spending my time looking for hard-to-find relevant resources, I can spend more time helping my students to learn.

— Olivera Marjanovic, University of Sydney
Ultimately, professors will find ways to help students build their résumés to align with job postings by changing what they teach.

Fourth, encourage your software and hardware vendors to make products available to colleges and universities, ideally at little or no cost. Fortunately, many of the leading vendors already have recognized and responded to this need. New vendors appear in the marketplace regularly, so you can work to build an emerging vendor’s awareness that academic exposure of their products and services helps everyone.

Finally, offer to speak to classes and demonstrate real-world applications of BI in your organization. That’s a win-win-win proposition: students learn what is in store for them when they enter internships and careers; faculty members learn what is happening today in practice; and you will have fun sharing your knowledge and building connections for hiring and future networking. As one survey respondent suggests, “Due to the fast development of the field, often the practical application of BI is more advanced than the academic foundation.” Thus, you reduce the gap between the field and the classroom each time you make time to speak at your local university.

**Final Words**

Recent surveys have revealed considerable business interest in BI. Faculty and students have noticed this interest. More schools are teaching BI and more students are enrolling in BI courses. We find that BI fascinates students, and many would like to pursue it as a career. This past year we have helped students find employment with companies, consulting firms, and vendors. As faculty, it is satisfying to educate the next-generation BI workforce.

We plan to expand our BI survey this year and report further on the current state of BI education.

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I coordinate the MIS Advisory Board at the University of Georgia. We typically have about 20 corporate members (e.g., Teradata, Deloitte Consulting) and 20 individual members. We meet twice a year to discuss the curriculum, new developments in the field, company hiring needs, and joint research opportunities. We also involve our students in the meetings. Our MIS curriculum and activities are strongly influenced by what the board members tell us about their needs. I also put out a call each semester for board members to speak to classes. A typical MIS class will have two or three guest speakers, whom the faculty and students really enjoy.

— Hugh Watson, University of Georgia

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Learning Competitive Intelligence from a Bunch of Screwballs

By Troy Hiltbrand

Introduction

During World War II, governments on both sides of the conflict relied on the radio as a vehicle for propaganda. Berlin, London, Moscow, Paris, Rome, and Tokyo all used the airwaves to sway the minds and hearts of listeners toward their particular political persuasions. As radio technology improved and its reach expanded, the battle for the airwaves heated up. Instead of being limited to propaganda focused on local constituencies, programs grew to target foreign audiences as well (Mercado, 2001).

During the summer of 1943, the Nazis touted the development of a new "super-weapon." Amid rumors of a weapon that could change the balance of power in the war, Allied forces put forth every effort to find out what this weapon was and how it would impact the war’s outcome. Aerial surveillance indicated that the Nazis did, indeed, have strange concrete buildings pointed at England. Spies indicated that Germany had developed secret weapons factories. Plans were laid out to bomb the installations, but it was not clear what the weapon was, what it could do, or how real the threat was. The Allies could not even be sure that the targets identified through surveillance were the true threat or clever decoys. This lack of knowledge was crippling to Allied forces because they didn’t have enough actionable information to correctly ascertain the real situation and plan appropriate mitigation efforts.

This is where the Screwball Division came into play. This group of talented analysts was responsible for listening to domestic broadcasts in Germany and Japan. They listened to the same shortwave radio broadcasts that the citizens of those countries heard. They took this content and
analyzed it, adding context to the information that was coming over the airwaves. Their goal was to identify what was being publicly stated in propaganda that was directly related to real events happening behind the scenes. Not only did they have to listen to these broadcasts in German or Japanese and translate them into English, but they also had to effectively glean information from a sea of noise. They had to extract meaning from static-laden radio broadcasts, sort through political slogans and military terms, and transform all of that into sensible English descriptions of broadcasts happening half a world away.

Remarkably, this team of “screwballs” was able to mine information based not only on what was being said, but also the context in which it was said. They knew that the propaganda was being carefully planned by Axis leaders to maximize its impact both in capturing the hearts of the people and effectively communicating their current situation. It had to be positive and uplifting to raise the spirits of the troops and people, but it had to be based in fact or it would dishearten listeners if the message did not come to fruition. Through inference, the Screwball Division was able to determine that Germany was indeed developing a weapon of epic proportions that had the potential of shifting the direction of the war. With this context, they were able to read between the lines and accurately identify what was happening with the development of this secret weapon.

In August, something significant changed in the propaganda. Talk of the weapon ceased for 10 days, and when it recommenced, its tone was less potent. This change in sentiment indicated that Germany had hit a setback in its development efforts.

Later that year, the message became more specific and serious, and the Screwball Division was able to ascertain that the weapon would be deployed between mid-January and mid-April of 1944. The secret weapon turned out to be the fabled V-1 rocket, and almost all of the analysts’ predictions based on inference proved accurate.

Through effective consolidation of information and the application of context to that information, the Screwball Division was able to direct efforts to Allied forces as they moved forward to win the war (Gladwell, 2007).

From this historical event, we learn three things about effective intelligence-gathering activities:

1. The activities need to consolidate multiple sources of information to get a complete picture of the situation
2. They need to extract key ideas from this intelligence stream
3. They need to organize and associate context to the information to derive true value

**A Contemporary Challenge**

The Idaho National Laboratory (INL) is the Department of Energy’s (DOE) lead lab for nuclear energy research and is dedicated to supporting the advancement of missions in nuclear energy research, energy and environment, and national security. The laboratory is operated by Battelle Energy Alliance (BEA) and participates both independently and jointly with other labs in its support for the DOE and other government organizations.

The information management department is a key support organization for the INL. Our challenge is to gather relevant information about the laboratory’s missions and determine how we can best support those missions. Another major challenge is knowing our customers and their needs so that we can successfully complete their missions.

**Technology Application**

Organizations need to understand their customers and competitors so they can respond competitively, but this can be a difficult and vexing challenge. Customers do not always reveal all of their needs, and competitors rarely come out and reveal what they are doing. However, this does not mean that hints about their plans are not abundant in information that is readily available. The challenge has always been keeping track of all that is happening and converting that data into useful information.

Taking the lead from the Screwball Division from World War II, we now have the tools available to automate this process and to mine the Internet for clues about what our customers and competitors are actively working on. By analyzing information that is published online and finding relationships within this data, we can build competitive intelligence and act upon it to further our organizations’ objectives.
There are three main steps to achieving competitive intelligence:

- Gather information
- Extract information
- Apply context to information

**Gather Information**

The first step of converting the abundance of information into competitive intelligence is gathering it. This requires a Web crawler that will take one or more starting points and crawl through the content. Crawling takes advantage of embedded links within content to identify further information. It systematically goes from page to page on the Internet and extracts the content in its raw form.

There are a number of open source Web crawlers available, but many of these are built to analyze findability. Although findability analysis is closely related to the text mining that is our objective, there are important differences. Peter Morville defined findability in his book *Ambient Findability* (Morville, 2005):

findability (n):
- a. The quality of being locatable or navigable
- b. The degree to which a particular object is easy to discover or locate
- c. The degree to which a system or environment supports navigation and retrieval

Findability analysis can be useful if you already understand what you are looking for but you are also trying to identify key concepts in large amounts of text. It requires the ability to perform text analysis or text mining.

Marti Hearst defined text mining as "the discovery by computer of new, previously unknown information, by automatically extracting information from different written resources. A key element is the linking together of the extracted information to form new facts or new hypotheses to be explored further by more conventional means of experimentation" (Hearst, 2003).

**WEB CRAWLERS**

Since most Web crawlers are targeted toward findability analysis, additional customization is required to support text mining. Possible options include WGet, Crawler4J, Arachnode.net, and Nutch.

- **WGet** (www.gnu.org/software/wget/) is a free software package for retrieving files using HTTP, HTTPS, and FTP that can be called from scripts and cron jobs. It is easy to use to retrieve simple pages, but it can also be used to crawl sites from a starting page and store those files to disk or process them.
- **Crawler4J** (code.google.com/p/crawler4j/) uses a simple interface for crawling the Web. Written in Java, it can be called from any program,

<table>
<thead>
<tr>
<th>Calls Per Day (Free)</th>
<th>Named Entity Extraction</th>
<th>Term / Keyword Extraction</th>
<th>Language</th>
<th>Other Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alchemy</td>
<td>30,000</td>
<td></td>
<td></td>
<td>Language detection, HTML cleaning, Topic categorization, Structured content extraction</td>
</tr>
<tr>
<td>OpenCalais</td>
<td>50,000</td>
<td></td>
<td></td>
<td>Social tags, Topic categorization</td>
</tr>
<tr>
<td>Zemanta</td>
<td>1,000</td>
<td>Increased to 10,000</td>
<td></td>
<td>Social tags, Topic categorization</td>
</tr>
<tr>
<td>Open Amplify</td>
<td>1,000</td>
<td></td>
<td></td>
<td>Sentiment of meaning (positive, negative), Demographics, Style</td>
</tr>
<tr>
<td>Belief Networks</td>
<td>500 with a key</td>
<td></td>
<td></td>
<td>Up to three custom corpora of 100,000 URLs</td>
</tr>
<tr>
<td></td>
<td>2,000 with a key</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>uClassify</td>
<td>No limit</td>
<td></td>
<td></td>
<td>Categorization</td>
</tr>
<tr>
<td>Yahoo!</td>
<td>5,000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Table 1. Content extraction services*
which provides flexibility in handling the retrieved content.

- **Arachnode.net** (arachnode.net) is a complete and comprehensive Web crawler written in .NET for downloading, indexing, and storing content from the Internet. It is built for high performance and has the ability to crawl, index, and search Microsoft Office (Word, PowerPoint, Excel) and Adobe PDF documents. The source code is available for this platform, allowing it to be customized to perform text mining activities.

- **Nutch** (nutch.apache.org) is Apache’s open-source Web search software built on Lucene Java. It is built for high performance and can be coupled with Apache Solr and Apache Hadoop for extended capabilities. It can crawl, index, and search plain text, HTML, XML, ZIP, OpenDocument, Microsoft Office (Word, Excel, PowerPoint), PDF, Javascript, RSS, RTF, and MP3 files. The Nutch source code is also available and can be customized for text mining.

**INTELLIGENCE SOURCES**
The Internet is large, and much of its content is irrelevant to our objective of learning about our customers’ and competitors’ activities. Before launching a crawler to gather information, we need to narrow the scope to several key areas. These sources will become the intelligence stream for gathering information activities.

- **Public Web sites.** The obvious place to start is the World Wide Web. Customers and competitors have public-facing Web sites full of marketing material and information about key projects and individuals associated with their companies. In addition, many companies post press releases and related news stories on their sites.

- **News feeds.** Many of the large search engines (e.g., Google News) consolidate news stories from around the Web, searching by topic or company name. Using this as an entry point into the overall Web can be an effective way to feed timely information into the intelligence stream.

- **Intranets/extranets.** Because our customer is internal, we have access to its intranet, which holds current news and announcements that are not available to the general public. In addition, this is a gateway to our document management system, which contains a wealth of knowledge about our customers’ work and capabilities. Extranets provide additional information about customers who are outside the organization but are partners in its business success.

- **Social media/message boards.** Communication has exploded on the Internet recently, and much of this messaging uses social media and message boards. Mining social sites such as MySpace, Twitter, Facebook, and message boards can provide information about what employees, customers, and other competitors are saying about a company and its current objectives.

- **RSS feeds.** Many sites and blogs have taken to the concept of pushing out small information snippets on a regular basis in the form of RSS (really simple syndication) feeds. These can provide timely updates to the information stream.

- **Documents.** Information regarding customers and competitors exists on the organization’s own network in the form of documents and slide presentations. Mining these and adding them to the information stream will enhance its capacity for clearly identifying key concepts.

- **SEC filings.** Public companies are required to file quarterly and yearly reports with the Securities and Exchange Commission (SEC) and publicly disclose the inner workings of their organizations. Since this is a legal requirement to pull back the covers on operations, filings contain significant information regarding what the company is really doing.

**Extract Information**
Information on the Web is relatively unstructured, which presents a challenge. HTML, the language of the Internet, is all about presentation and gives little structure to page content. Since HTML was designed to be flexible and allow for an infinite number of designs, there is no standard way to extract concepts from Web pages.

Over the last couple of years, there has been significant chatter on the Internet about embedding information in Web pages that will allow them to be consumed by automatic processes more easily. This is often referred to as the “Semantic Web.” Although the Semantic Web would greatly assist in the information extraction challenge, adoption is slow. Most companies do not see a compelling return on converting all their pages into a format that includes semantic information because such information is targeted at automated processes and not at end users.
With advances in information retrieval (IR) and natural language processing (NLP), we can identify semantic information even if it is not embedded in the code.

**INFORMATION RETRIEVAL SERVICES**

There are numerous Web services available free for limited use that allow us to extract useful information from the Web (see Table 1 for a sample). We tested the effectiveness of these services using text from the business intelligence entry on Wikipedia (retrieved June 17, 2010):

In a 1958 article, IBM researcher Hans Peter Luhn used the term business intelligence. He defined intelligence as: “the ability to apprehend the inter-relationships of presented facts in such a way as to guide action towards a desired goal.”

In 1989, Howard Dresner (later a Gartner Group analyst) proposed BI as an umbrella term to describe “concepts and methods to improve business decision making by using fact-based support systems.” It was not until the late 1990s that this usage was widespread.

**ALCHEMY**

Alchemy (www.alchemyapi.com) has a product suite that lets users perform named-entity recognition; keyword/term extraction; and topic categorization, language detection, automatic HTML cleaning, and structured content extraction.

With named entity recognition, people, company names, organizations, geographic features, and other types of entities can be tagged within content. We passed the test text through the named entity recognition service and it returned Hans Peter Luhn and Howard Desner as people and IBM and Gartner as companies.

With keyword/term extraction, tags identified as important or prevalent are returned. Keyword/term extraction resulted in nine tags associated with this text:

- Hans Peter Luhn
- IBM
- Gartner Group
- Business intelligence
- Data analysis
- Data management
- Mathematics

**OPENCALAIS**

OpenCalais (www.opencalais.com) also provides a tool for text extraction that allows for semantic tagging to be added to text and HTML content. OpenCalais supports the extraction of entity/fact/event terms and document categorization.

In addition to these tools, OpenCalais extracts generic relations between words. In the test text, OpenCalais associated Hans Peter Luhn as a researcher at IBM and Howard Dresner as an analyst at Gartner, Inc.

Social tags emulate how a human would tag the article. This applies common-sense logic to the text as a whole to add a human perception of its classification. OpenCalais identified the following social tags:

- Intelligence
- Computing
- Psychology
- IBM
- Luhn algorithm
- Hans Peter Luhn
- Data analysis
- Business intelligence
- Data management
- Mathematics

**ZEMANTA**

Zemanta (www.zemanta.com) focuses on identifying relevant images, smart links, keywords, and text associated with content. In the test text, Zemanta identified the following relevant in-text smart links:

- business intelligence
- Hans Peter Luhn
- Gartner Group
It also identified the following relevant tags:

- IBM
- business intelligence
- Gartner
- Business
- Hans Peter Luhn
- Databases
- Data Warehousing
- Intelligence

**OPEN Amplify**

Open Amplify (www.openamplify.com) uses natural language processing to identify what it calls “signals,” which are significant topics, brands, people, perspectives, emotions, actions, and time scales contained in the text.

From our example text, Open Amplify identified:

<table>
<thead>
<tr>
<th>Signal</th>
<th>Type</th>
<th>Sub-Type</th>
<th>Polarity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hans Peter Luhn</td>
<td>Person</td>
<td>Male</td>
<td>Positive</td>
</tr>
<tr>
<td>Howard Dresner</td>
<td>Person</td>
<td>Male</td>
<td>Positive</td>
</tr>
<tr>
<td>researcher</td>
<td>-</td>
<td>-</td>
<td>Positive</td>
</tr>
<tr>
<td>Group analyst</td>
<td>-</td>
<td>-</td>
<td>Positive</td>
</tr>
<tr>
<td>IBM</td>
<td>Organization</td>
<td>Company</td>
<td>Positive</td>
</tr>
<tr>
<td>BI</td>
<td>Named Entity</td>
<td>-</td>
<td>Positive</td>
</tr>
<tr>
<td>Gartner</td>
<td>Organization</td>
<td>Company</td>
<td>Positive</td>
</tr>
</tbody>
</table>

In addition to capturing signals, it also captures the actions referred to in the content:

<table>
<thead>
<tr>
<th>Action</th>
<th>Type</th>
<th>Temporality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use the term intelligence</td>
<td>Other</td>
<td>Past</td>
</tr>
<tr>
<td>Propose BI</td>
<td>Communicate</td>
<td>Past</td>
</tr>
<tr>
<td>Define Intelligence</td>
<td>Other</td>
<td>Past</td>
</tr>
</tbody>
</table>

**Belief Networks**

Belief Networks (www.beliefnetworks.net) strives to extract other terms that would have relativity to the terms in the provided content:

- Adstar
- Broadway (microprocessor)

Belief Networks also allows a user to define a corpus of terms that are relevant to the organization to further refine what is being returned in the list of applicable terminology. This is done by feeding it a list of sites and RSS or Atom feeds to monitor and build out the organization-specific knowledge set.

**UClassify**

uClassify (www.uclassify.com) focuses on classifying the text into a category and classifying the language. In our test text, the service classified the text as English and identified these categories:

- Computers (74.0%)
- Science (13.9%)
- Society (6.3%)
- Business (2.2%)
- Arts (1.8%)
- Health (1.1%)
- Games (0.6%)
- Sports (0.1%)
uClassify also has a number of Public Classifiers that have been published by users. For example, there are classifiers for tonality, mood, Myers-Briggs Attitude/Judging/Perceiving, and gender.

**Yahoo!**
Yahoo! (developer.yahoo.com) provides a list of significant words or phrases from content. Analysis of the sample text returned the terms “Gartner group analyst,” “Business decision,” “1990s,” and “umbrella.”

Once we pass the content through these multiple services, we are able to capture a comprehensive list of key ideas and terms to evaluate in our competitive intelligence analysis.

**Context Association**

The final step in the competitive intelligence process (Figure 1) is to take the terms that have been extracted and give them meaning through context association. There are four main areas that have to be considered when adding context to the information: timeliness, relevance of information source, connection, and message strength.

**Timeliness.** The first factor in the evaluation is the timeliness of the content. Terms extracted this week from the intelligence stream are more relevant that those that were published last year. In the extraction process, the date that the content was last updated can work as an indicator of its age. In the case of dynamic sites that are built on the fly even when the content does not change, the crawler can evaluate the content to identify when it changes and record the pull date as appropriate. This will allow the timeliness factor to be evaluated.

**Relevance of information source.** As the process is refined, different sources will produce content of different levels of quality. A filing to the SEC has to be accurate by law and should have a higher overall importance than a conversation on Facebook. Assigning each of these sources or types of sources with a relative importance factor will increase the relevance of the information coming through the intelligence stream.

**Connection.** As the crawler starts to scan the Web for relevant information, it will be directed away from relevant sites and information into areas where the information has less importance to the objective. To ensure that the extracted terms have a relevant connection to the goal of the intelligence gathering exercise, use the customer or company of interest as the focal point, associate key people and projects to that customer or company, and identify key concepts to those individuals or projects.

**Message strength.** The final context factor is the strength of the message. This will be determined by how often the terms or ideas are mentioned among the different feeds to the intelligence stream and how many times within a document or site the term or message is mentioned. When combined, these factors will accurately determine the importance of the overall message.
Once the content has been gathered, the key ideas extracted, and context applied to information, it can be delivered to end users to act upon. One effective method of showing the information and its relative importance is a tag cloud.

Tag clouds were first used on the photo-sharing site Flickr. The concept is to display a list of terms alphabetically, varying the size and weight of the text to indicate each term’s importance.

The INL previously described is part of the DOE complex of research laboratories, so understanding the key areas of importance to the other national laboratories in the complex is important to ensuring a successful mission. Figure 2 shows a tag cloud for Brookhaven National Laboratory, a sister laboratory in the DOE complex.

Conclusion

During World War II, the Screwball Division was able to capture and consolidate data, extract key concepts, and add context to the content coming out of Nazi Germany. Today, we can use the same concepts to understand our competitors and customers and gain an advantage through competitive intelligence. Effectively synthesizing and presenting this information to decision makers will provide the information they need to guide their organizations to success.

RESULTS


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REFERENCES


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PivotLink provides powerful business analytics that puts you in the driver seat. Learn how at pivotlink.com.
Using BI to Assess BI: The Efficacy Conundrum

BY STEPHEN SWOYER

Some adopters seem disinclined to use BI technologies to assess the efficacy of their business intelligence (BI) and data warehousing (DW) practices.

A recent survey from market watcher International Data Corp. (IDC) shines a light on the state of analytic efficacy. Simply put: when it comes to analytics, a surprising percentage of shops don’t know what or how well they’re doing. For example, one-third of respondents in IDC’s survey say they lack the means to determine if their analytic projects are successful.
IDC sampled more than 6,400 end users across a variety of industries. Awareness of analytic efficacy was higher in some verticals (finance, communications) and lower in others (education, manufacturing). The upshot, the analyst firm concludes, is that “the potential to gain competitive advantage from an increased investment in business analytics”—an outcome that owes much to the judicious incorporation of analytic insight into business decision making—“is ... hampered by a lack of effective measurement methodologies.”

This isn’t news to many BI experts. Take industry luminary (and frequent TDWI presenter) Cindi Howson, who annually assesses the BI tools market for her BIScorecard.com. Howson clearly knows whereof she writes: her seminar-length comparisons of BI and performance management (PM) tools are standing-room-only affairs at TDWI World Conferences. In one of her recent BIScorecard.com tallies, Howson found that both the usage and the perceived efficacy of BI tools declined in 2009 relative to earlier tallies.

Howson asked organizations to rate the “success” of their BI efforts; practices in which BI tools were used to help drive decision making were judged “successful.” Just over one-fifth of shops rated their BI practices as “successful” last year, against almost one quarter in 2007, according to Howson.

IDC and Howson are measuring two very different things, of course: analytic efficacy (in the case of the BIScorecard.com usage survey) versus the ability to identify analytic efficacy (in the case of IDC’s sample).

**Measuring the How, When, Where, and Why of BI**

A larger issue, experts say, is that not all adopters are making an effort to understand how, when, where, or why they’re using BI. For all of the talk about BI ROI, a substantial portion of adopters—perhaps as many as one-third, according to IDC—simply aren’t in a position to assess ROI.

Michael Corcoran, senior vice president and chief marketing officer with Information Builders (IBI), says he’s unfailingly surprised by how few companies actively monitor their BI usage.

This is in spite of the fact that IBI started bundling a monitoring facility with its flagship WebFOCUS BI suite more than a decade ago. The not-so-novel idea, Corcoran explains, was that customers could use WebFOCUS to assess its own performance. The rub? After 10 years, Corcoran still has to goad customers into doing so.

“We have to tell them, ‘Turn this on. Use this.’ It can help you understand who’s using [WebFOCUS], when they’re using it, how much utilization it has, what [reports are] most popular. You can get more granular from there. The important thing is to start [monitoring BI usage] in the first place.”

**SIMPLY PUT: WHEN IT COMES TO ANALYTICS, A SURPRISING PERCENTAGE OF SHOPS DON’T KNOW WHAT OR HOW WELL THEY’RE DOING.**

In the age of pervasive analytics, the stakes are higher. A decade ago, BI technologies such as WebFOCUS weren’t so much used to drive—via the disclosure of new insights—as to confirm the business decision-making process, chiefly by serving up reliable, up-to-date operational or production reports. These reports were sometimes complemented by multidimensional reports generated by then-far-from-mainstream OLAP technologies, such as Oracle’s Express, Hyperion Solution’s (nee Arbor’s) Essbase, Applix’s TM1, and Microsoft’s (then-fledgling) Plato OLAP implementation.

A decade later, OLAP has gone mainstream, advanced analytics—a category that encompasses data mining, predictive analytics, and statistical analysis—has come to the fore, and shops are gearing up to integrate analytic capabilities into a growing number of applications.

In IBI’s case, Corcoran says, a lot of users aren’t even aware that they’re consuming analytics, or that they’re interacting with a third-party reporting handler of any kind. That’s great for driving BI consumption, Corcoran notes, but not so great when it comes to determining BI efficacy. “That’s actually a very effective marketing tool. When a customer does that [turns on the built-in WebFOCUS monitoring facility] and sees what they’re doing, sees how [WebFOCUS] is used by just so many different users,” he concludes. “It’s even better when they’re using [WebFOCUS] to determine how [consumers] are using these
[insights] to help them do their jobs or [to] inform some of their decisions.”

Application usage monitoring isn’t a neglected market segment, of course. It has been a mainstay of the software asset management (SAM) toolkit for decades, for example. More recently (in the last 15 years or so), vendors such as BMC Software, CA, Compuware, and the former Peregrine Systems (among others) have introduced dedicated application performance management (APM) software tools. One core component of APM is its ability to monitor application telemetry—e.g., usage, reliability, availability, and other (often environment-specific) metrics.

Particular to the BI segment, Appfluent Technology markets Visibility, a usage and workload analytics offering designed for BI and DW practices. It has partnership agreements with several BI players, including SAP BusinessObjects, the former Cognos (now an IBM company), Informatica, and Oracle.

IDC’s survey doesn’t just concern the pervasiveness or usage of enterprise analytics, however. Instead, it addresses the purported efficacy of analytic technologies. In other words, traditional APM metrics—such as utilization—yield an incomplete picture of how analytic technologies are being consumed. Usage monitoring tells you how, when, and sometimes why, but not to what end. That’s why IDC urges shops to develop effective measurement methodologies to assess analytic efficacy.

One IDC recommendation: a methodological process that harnesses BI, analytics, and performance management (PM) concepts and methods. “Technology vendors and consultants need to focus on applying business intelligence and analytics on the business analytics projects to ensure that BI groups are able to clearly articulate the benefits to their constituents and ensure ongoing funding of projects,” IDC says.

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According to a recent report from industry veteran Howard Dresner, the power and influence of IT is waning while that of business users continues to increase.

That’s just one of the conclusions of Wisdom of Crowds, a new business intelligence market study by Dresner's consultancy, Dresner Advisory Services. Dresner, like the former E.F. Hutton, has undeniable cachet in his area of expertise: when he talks, folks listen. He's credited with first coining the term “business intelligence” (BI) more than two decades ago, when he was still a research analyst with the former Gartner Group (now Gartner).

Dresner says his new report “give[s] a voice” to the actual consumers of BI tools: workers in the trenches, from both business and IT backgrounds, who have firsthand experience with the performance, capabilities, and shortcomings of prominent BI tools.

Dresner’s survey underscores the dichotomy between the generally conservative comportment of IT departments on the one hand and the more aggressive preferences of business buyers on the other.

Dresner Advisory Services breaks the BI vendor market down into three segments: titans, established pure plays, and emerging vendors.

IT organizations across all industries and geographies as well as larger shops tend to have a preference for vendors in the former two categories. “In contrast,” Dresner writes, “Emerging vendors ... are favored by smaller organizations and business users.”

Such players—with the exceptions of open source and non-U.S.-based ISVs—are predominantly based on North America, he points out.

Elsewhere, Dresner Advisory Services finds, the influence of IT on BI buying and deployment patterns is diminishing—in North America, at any rate. The researcher points to an “inflection point” in just the last two years during which individual business domains (e.g., sales and marketing, finance, research and development) started adopting BI technologies independently of input from IT.

The reverse seems to be the case outside of North America, however. In non-North American locales, in fact, “it would appear that the IT department has expanded its dominance of BI,” Dresner writes.

A Closer Look
BI adoption also isn’t as monolithic as it might at first glance appear.
Although large shops tend to have the biggest BI deployments, and likewise tend to partner with bigger, more established players, smaller BI implementations—consisting of best-of-breed offerings, point solutions, and ad hoc tools—nonetheless exist in almost all large shops.

Such tools aren’t pushed as top-down standards or tapped for use as part of company-wide initiatives, but are widely used on a divisional, departmental, or individual basis, Dresner notes.

For this reason, small and large shops alike tend to use a mix of BI tools, in spite of the best efforts of the big suite players (viz., IBM, Oracle, and SAP AG), which have extolled the virtues of BI tools standardization. Although such efforts might make sense from an IT perspective, they are less popular with business users.

“It’s quite common for larger organizations to have many smaller implementations and tools throughout the enterprise. Historically, this has been the way that BI products were sold—to the business users and management,” Dresner writes. “For a period of time this shifted, with vendors increasingly selling jointly to IT departments and business users. This trend may be swinging back in favor of selling to the business user. This will serve to increase the numbers of discrete tools within larger organizations.”

**Tactical, Not Strategic**

Dresner flags a related trend that suggests a possible “paradigm shift” in BI buying patterns.

“When we begin to look at BI implementations globally, over time, we see what might represent a paradigm shift in the industry—away from large implementations and in favor of smaller or moderately sized ones,” he writes.

Dresner Advisory Services suggests several possible explanations for this trend, starting with the growing power and influence of business users, who tend to “focus on departmental (parochial) problems and ... purchase solutions for smaller groups or individuals.”

Other causes include fresh uptake of BI tools by new adopters in established markets or by companies in underserved or emerging geographies.

Today, certainly more so than a decade ago, BI practices aren’t nearly so difficult to build up or deploy. Dresner says that more than 40 percent of new BI deployments are undertaken by new adopters, some of them in emerging geographies. Such efforts will tend to start small, the researcher notes.

**Crowds and Power**

Not only do business users have more of a say in BI buying plans, they’re increasingly likely to adopt and in some cases deploy BI tools without first soliciting IT’s approval. This trend has likewise encouraged ISVs to rethink the ways in which they develop, license, and market their software.

**THE GROWING INFLUENCE OF BUSINESS USERS IN THE BI BUYING STAKES IS WHAT DRESNER CALLS THE “WISDOM OF THE CROWD.”**

The growing influence of business users in the BI buying stakes is what Dresner calls the “wisdom of the crowd.”

Crowds don’t always behave rationally, however. In fact, crowds aren’t typically associated with wisdom, though the crowd in and of itself doesn’t have to be a bad thing. If Dresner, for example, made his name as a BI visionary, author Elias Canetti made his name—and won his Nobel Prize—largely on the strength of a single book, *Crowds and Power*. Canetti, then, knows crowds.

One of his important insights is that there are different kinds of crowds—e.g., open crowds, closed crowds, stagnating crowds, and so on. Open crowds, for example, are alert to the possibility of continuous, uninterrupted growth (i.e., of change). Closed crowds, on the other hand, are willing to trade growth for stability. For most of its existence, IT has been a closed crowd.

If Dresner’s conclusions are correct, however, IT needs to become more proactive, more responsive, more solicitous—in short, IT needs to become an open crowd. If it doesn’t, it runs the risk of becoming irrelevant.

“It is the aware and astute organization that will assess changes in the market and plan and execute accordingly,” Dresner concludes.

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There are a number of reasons customers are adopting analytic database technologies.

One big driver, according to Philip Russom, senior manager at TDWI Research, is the growing complexity of analytic workloads—and, particularly, of the kinds of queries associated with what Russom and other experts term “advanced analytic” technologies.

Advanced (or next-generation) analytics, which prescribe the use of extremely complex (often SQL-driven) queries or predictive analytics, is hot.

It’s a trend that analytic database players tend to see as especially salient because it both exposes the limitations of conventional DW architectures and showcases the putative benefits of next-generation data warehousing platforms. Such DW systems are almost always based on massively parallel processing (MPP) technology. In many (but not all) cases, they reprise the use of a column-based (or “columnar”) architecture, too.

Without exception, analytic database players tout MPP as a sine qua non for advanced analytics. Conventional DW systems, they allege, just can’t get the job done. What’s more, Russom concedes, there’s a sense in which they’re right on the merits: he cites a TDWI survey in which fully 40 percent of respondents expressed misgivings about the analytic capabilities of their existing DW platforms. (In the same survey, 51 percent of respondents said that they planned to adopt an analytic database platform at some point over the next five years.) Conventional data warehouse
implementations are designed chiefly to address reporting or basic OLAP, Russom explains.

“There are multiple forms of advanced analytics, including those based on data mining or statistics and those based on complex ad hoc SQL statements. The former may or may not run in a DBMS, depending on the vendor’s analysis tool capabilities, which is a problem when it forces users to move data out of the data warehouse for the sake of analysis, then back in,” Russom explains.

**Bringing Brawn to Bear**

The upshot, Russom observes, is that advanced analytic approaches that rely chiefly on complex or ad hoc SQL statements are particularly hamstrung by poor query performance. Almost half (45 percent) of analytic adopters cited “poor query response” as a decisive factor in their deployment decisions.

It’s in this respect, especially, that analytic database specialists like to target conventional data warehouse platforms, such as out-of-the-box Oracle, SQL Server, or DB2. “Our sweet spot is where you’ve got queries where you need the response in a matter of seconds, or sometimes in sub-seconds,” comments Barry Zane, CTO with columnar database specialist ParAccel.

Zane claims that his company’s ParAccel Analytic Database (PAD) is an “extremely mature, extremely full-featured” platform, but concedes that, for many prospects, PAD’s primary selling point is its columnar MPP brawn.

“You’re talking about a class of querying—whether it’s interactive or whether it’s just many, many users—where you’re using these extremely complex [SQL] queries and you need responses in seconds. You can’t wait hours. That’s where we’re seeing the most interest, to be honest,” he continues.

ParAccel, like other specialty analytic players, takes aim at all of the entrenched heavies, including, significantly, high-end data warehousing stalwart Teradata. Zane, for example, articulates a variation on a theme—namely, that MPP brawn deployed in combination with columnar technology can whip most query performance issues—that’s echoed with a vendor-specific emphasis on the importance or unimportance of a columnar architecture by most other analytic database players. It’s an intriguing message that, in ParAccel’s and other cases, seems tailored to counter Teradata’s pitch, in particular.

“I will say that without a doubt, Teradata has absolutely the best controls for setting up priority lists and managing concurrency, but—it’s really simple enough—when you have something that’s blazingly fast, people can coexist and share the machine without setting up priority lists,” Zane says. “If [users are] getting their responses in several seconds or at most a minute, concurrency becomes a smaller issue.”

**ALMOST HALF (45 PERCENT) OF ANALYTIC ADOPTERS CITED “POOR QUERY RESPONSE” AS A DECISIVE FACTOR IN THEIR DEPLOYMENT DECISIONS.**

The same can be said for Vertica, which, like ParAccel, markets a columnar MPP database system. “We see columnar becoming the de facto standard [for analytic requirements],” comments industry veteran Dave Menninger, vice president of marketing with Vertica. “You see even the row-oriented vendors attempting to retrofit or shoehorn some columnar capabilities into their products. It’s like that with MPP, too. No one seriously disputes the performance benefits of using [either technology] in analytic [applications].”

Data warehousing luminary Foster Hinshaw, CEO of analytic appliance specialist Dataupia, espouses a vision emphasizing the virtues of MPP technology yoked to his company’s traditional column- and row-based DBMS. Hinshaw, not surprisingly, downplays the importance (and benefits) of a columnar architecture, arguing that Dataupia’s Satori servers offer more than enough horsepower for any conceivable analytic requirements.

“What we have is a [strong] MPP engine. It’s very scalable. You can add a blade or two blades or five blades, and scale from there. In fact, we announced ... the largest Oracle database in the world,” said Hinshaw, during a sit-down interview at the 2010 TDWI World Conference in Las Vegas.

Hinshaw was alluding to one of Dataupia’s most prominent reference customers: Subex Ltd., a billing and operations-support specialist based in...
Bangalore, India. Subex maintains a 510 TB data warehouse that supports its revenue operations center.

Workload Management Haves and Have-Not

Inasmuch as a brawn-beats-all message takes aim at conventional DBMS products from IBM, Microsoft, Oracle, and Sybase, it especially targets Teradata, which touts its workload management (WLM) capabilities as a best-of-breed differentiator.

True, some analytic database specialists claim to deliver improved workload management features: Aster Data Systems, for example, touts a WLM facility that it says invites comparison with Teradata’s Active Systems Management (TASM). Menninger says Vertica introduced improved WLM features in its recent Vertica 3.5 release. For the most part, however, analytic players tend to promote the virtues of MPP speed and brawn.

Randy Lea, vice president of product and services marketing with Teradata, disputes this claim, dismissing it as the stuff of oversimplification or caricature.

“Workload management continues to be a huge focus for us, a huge differentiation,” he avers, arguing that, for all of their burgeoning strategic chic, most analytic database platforms are still deployed in tactical implementations (e.g., as data marts). In such a scheme, Lea says, workload management might not seem to matter; at most, you have a limited number of user classes accessing the system. The shift to an enterprise data warehouse (EDW) topology drastically complicates this arrangement, however. Teradata, Lea concludes, is still a big believer in the virtues of the EDW, notwithstanding its recent concessions in the data mart arena.

"Even if I have a data mart, I still have business rules and requests that I would like to implement. [For example:] the CEO gets high priority on his requests. That’s a good decision,“ he explains. “We have the ability based upon time, based upon query execution, [or] based upon user [or] application, to [enforce] some of these business rules [so] that you are best utilizing the warehouse.”

Who’s right? Is the MPP pitch championed by the likes of Netezza, Dataupia, ParAccel, Vertica, and others chiefly a function of what Teradata’s Lea likes to describe as a “nonexistent” workload management strategy?

Yes and no. Experts say Teradata has refined its WLM-or-bust pitch in response to the bottom-feeding incursion of Netezza, Dataupia, and other vendors into its bread-and-butter, high-end data warehousing market. The truth is that both sides have merit.

“WLM is useful when you’re following a unified platform model and you need to guarantee a real-time SLA for some portion of the workload from the data warehouse,” comments veteran DW architect Mark Madsen, a principal with consultancy Third Nature. Now as ever, Madsen says, DW practitioners must choose between what might be called all-encompassing, top-down and loosely federated, bottom-up approaches.

“One choice is a big unified platform and WLM to fit a heavily centralized architecture. The other choice is to construct marts that are designed with high availability and response time to meet those operational needs, and leave the more heavy analytical queries on the main platform,” he points out. “Then [there’s] the big but ... what if the heavy queries also need current up-to-date data?”

All the same, Madsen isn’t persuaded by a brawn-beats-all pitch.

“I don’t think more brawn deals with the problem, because it’s one of concurrency and light versus heavy work. If a system is designed for throughput of big things, small ones will still get stepped on, just faster and more frequently,” he concludes.

“WLM as a focal point seems to be driven more from a centralized bottleneck-inducing architecture for data management. Still, I’ve wanted better features to do it in my own centralized, bottleneck-inducing architectures. Sometimes you don’t have an alternative.”

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Can Data Integration Be Agile?

BY PHILIP RUSSOM

Methods for agile software development have been around for 10 years, and for the last couple of years they’ve been penetrating projects for business intelligence (BI), data warehousing (DW), and data integration (DI). Traditional agile methods stress iterative revisions that quickly lead to a usable software product based on direct input from end users. The agile approach seems to apply well to BI, in the sense of reports, dashboards, BI portals, and analytic applications. Yet agile methods don’t seem to apply as directly and effectively to DW and DI. In this article, I’ll list the barriers to achieving agile DI (with a few comments about agile DW), then list recommendations for vaulting the hurdles.

To review, agile methods originated to speed up the development of code-laden procedural logic for operational and transactional applications that automate a business process. BI’s reports and dashboards are similar to these applications, so agile methods apply directly to BI. However, DW and DI tasks are quite different in that they focus on data and the repurposing of data, in the context of long-term infrastructure that will be shared by many teams.
For example, BI reports and dashboards depend on data to populate them, but that same data, in turn, has far more dependencies from a project viewpoint. When provisioning data for BI purposes, DI development involves many time-consuming tasks that resist acceleration. These include getting approval to access source systems, profiling source data, improving and documenting metadata and master data, developing data transformations, deploying interfaces, modeling data for target systems, assuring data quality, and so on.

In addition, DI and DW work must comply with agreed-upon standards for data models, cross-system interfaces, architecture, governance, and stewardship. These enterprise-scale standards transcend the individual development project and so cannot be omitted for the sake of speed or agility.

Furthermore, DI in support of DW is not a one-off, standalone project, as many operational and transactional applications are. Instead, DI builds shared infrastructure in that it assembles data that many reports, dashboards, analyses, and a wide range of applications will tap. To assure an appropriate level of reuse for DW data, DI solutions must be crafted to collect the right data, transform and cleanse it for an intended purpose, and document it carefully so BI developers and business end users understand exactly where the data came from and what it represents.

Given that background, we can now answer the question posed in this article’s title: “Can data integration be agile?”

Yes, DI can indeed be agile, though perhaps not as agile as BI. In fact, a new practice for agile DI is currently emerging, despite the hurdles explained earlier. Even so, take note that the following caveats and recommendations:

**Agile BI developers must allow time for DI/DW development.** Team members who develop BI prototypes and drive iterative versions must plan for how the BI product will be populated with data. If the necessary data is not already in the DW, the BI developer must allow time for data modeling and DI development, plus coordinate BI work with related DI/DW work from other team members.

**Agile DI specialists should build skills for generating test data.** The point is to provision data for early prototypes and iterations created by BI developers, but do so quickly and with minimal effort.

**Expect to refactor test data sets in support of rapid iterations.** Incrementally improve the prototype data set, even if it will be tossed out eventually. In parallel, you must apply what you’re learning to a permanent DI/DW solution.

**Tolerate wasteful practices if they accelerate broader development cycles.** Tossing a prototype data set seems like a waste of time, although we could argue that prototypes are supposed to be disposable.

**YES, DI CAN INDEED BE AGILE, THOUGH PERHAPS NOT AS AGILE AS BI.**

**Agile DI practitioners still have to document data that’s headed for the DW.** Otherwise, you put in peril the DW’s role as “the single version of the truth” that’s reused by many people and applications. Documentation is usually applied to metadata, master data, and DI objects (e.g., routines, jobs, data flows). Depend on DI tools that can automatically generate documentation from these. Resist application-centric agile methods that seek to expunge all documentation.

**Don’t let anyone use agility as an excuse to throw out DI best practices.** Given the speed and disposability of data set prototypes, it’s hard to find time or even rationalize applying best practices in data quality, transformations, metadata development, and data modeling. These best practices may be ignored at the beginning of an agile sprint but should be incorporated incrementally in mid-to-late iterations of the sprint, as you abandon the prototype and start formal development of the deliverable.

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Seminole Gaming operates seven casinos throughout Florida, including two Hard Rock Hotel and Casinos. The multibillion-dollar company prides itself on controlling costs while achieving ultra-high profit margins. Credited with pioneering Native American gaming in the U.S. in 1979, the company has long been recognized for its innovation in gaming and technology.

Seminole Gaming’s BI/DW solution was developed to deliver superior reporting and analytics to key decision makers within the company on a daily basis. The solution was born out of necessity when a key business user recognized the need for faster, more robust, and more customized reporting and analytics. Consistent with the company philosophy of maintaining high margins, the BI/DW solution was built on a shoestring budget and has allowed Seminole Gaming to enjoy considerable success while maintaining integrity and control over its data with virtually no vendor assistance.

The BI/DW solutions unified the company’s 10 disparate source systems, forming a single reporting platform from which operators could make informed decisions. It also formed the framework for what will soon become a real-time analytics platform accessible to corporate analysts as well as to all the casino operators in the company—a first in the industry.

Seminole Gaming’s solution was built in a short time (just over one year) using few resources: one full-time employee, a few shared FTEs, and $250,000 in hardware expenses. The total cost is less than 0.05 percent of the company’s annual revenues.

Customer Intelligence

Winner: Blue Cross Blue Shield of Massachusetts
SOLUTION SPONSOR: Netezza

Blue Cross Blue Shield of Massachusetts (BCBSMA) provides quality healthcare coverage to approximately three million members. As a non-profit, it is committed to delivering world-class service to its members and to being a good corporate citizen and community partner.

Previously, BCBSMA’s Web interactions had been limited to members logging in to check their health insurance plan benefits and claims history—a passive, static system that failed to engage members in their healthcare. BCBSMA also educated its members about health screenings and wellness programs through generic newsletters, which were rarely read. The challenge was to find a cost-effective mechanism to deliver secure, personalized messages to
members. BCBSMA also had several new initiatives to reduce health costs, which depended heavily on an engaged, educated consumer making informed decisions about preventive care, provider networks, and appropriate care sites.

The purpose of the project was to (1) leverage the wealth of information and tools available on the data warehouse to deliver personalization; (2) build a system that was system- and delivery-channel-agnostic; and (3) build a mechanism to measure the efficacy of personalization.

BCBSMA built and deployed an innovative solution that successfully integrated its data warehouse and member Web portal to produce near-real-time, personalized messages for its members. The framework is also scalable to handle new data sources, alerts, reminders, and campaigns with minimal coding changes.

**Dashboard and Scorecards**

*Winner: GUESS, Inc.*  
*SOLUTION SPONSOR: MICROSTRATEGY*

GUESS, Inc., is a widely recognizable apparel company, with over 1,200 retail stores worldwide that provide a lifestyle collection of apparel and accessories. The enduring strength of the GUESS brand name and image depends on the company’s consistent emphasis on innovative and distinctive product designs that stand for exceptional styling and quality.

In early 2008, GUESS embarked on a project to enable its executives and field personnel to receive critical information on BlackBerry devices using MicroStrategy Mobile. Users receive daily mobile scorecards for a comprehensive view of the business. Based on the success of the application in the U.S., the Mobile application was expanded to executives in Asia and U.S. district managers.

Later in the year, GUESS began creating dynamic dashboards to utilize a new, visually compelling, intuitive form of information delivery to provide increased visibility across multiple business areas. Three dashboards were created. Buyers and planners are now able to quickly view and digest product and sales performance, eliminating the need for manual recaps. Finance, merchants, and executives can track daily sales performance and easily drill down to spot pain points. Product designers, merchants, and executives are able to visually analyze the best-selling styles along multiple brands and product categories, giving them a much clearer view of trends.

By introducing dashboards to non-traditional BI users, GUESS has made BI pervasive across its vast user community. The results are intuitive and stylish dashboards that deliver significant information in a graphical way.

**Data Governance**

*Winner: Sallie Mae*  
*SOLUTION SPONSOR: DATAFLUX*

Sallie Mae is the nation’s leading provider of programs for saving, planning, and paying for education. Sallie Mae manages $188 billion in education loans and serves 10 million student and parent customers. Through its Upromise affiliates, the company also manages more than $19 billion in college savings plans and is a major, private source of American college funding contributions, with 11 million members and more than $500 million in member rewards.

The potential business value of data governance (DG) inspired Sallie Mae to launch a DG program, and it has seen tremendous impacts on its business operations. The program’s objective was to “solve boundary-spanning issues by pulling together the pieces of the data puzzle.” Its initial goal was to use horizontal alignment to achieve what is impossible to do in separate, vertical data silos.

Sallie Mae increased revenue by $2.4 million for the first two years based on an estimated increase of $50 million in loan volume. It eliminated costs of $4.8 million by replacing letters/postage with e-mail campaigns. Since the program’s inception, the company has resolved 75 percent of the data issues that have been elevated to the program, and also integrated DG with all of its application development processes. The program is now inextricably linked to the enterprise infrastructure and architecture.

The DG program has paid off both financially and operationally, as it enables Sallie Mae to both save money and make better business decisions.

**Enterprise Business Intelligence**

*Winner: Telenor Pakistan*  
*SOLUTION SPONSOR: TERADATA CORPORATION*

Telenor Pakistan launched its GSM network in 2005 and became the fastest-growing mobile operator in the country. With 23 million subscribers and coverage reaching deep into the most remote areas of Pakistan, Telenor Pakistan is, in some places, the only operator connecting the previously unconnected.

After establishing a robust and integrated EDW, Telenor Pakistan invested much more in commercial BI applications. Before implementing enterprise BI, the company focused on setting up a robust data warehouse that was fed by multiple
source systems and could provide a 360-degree customer view. The BI sponsors from top management had always envisioned data warehousing and BI as the strategic platform that can provide a sustainable competitive advantage.

Keeping up with the vision to make BI a strategic partner in key areas, Telenor Pakistan now uses enterprise BI to enable key stakeholders across the organization and to tailor BI solutions to their needs. Initiatives include:

- Integration with customer care to enhance customer experience: Behavior-based call center routing and a magic screen project to support up-selling and cross-selling
- Location intelligence implementation on multiple subject areas
- Analytical models based on advanced data mining for churn prediction and behavioral segmentation
- Advanced OLAP (BI 2.0), dashboards, business performance management, and forecasting
- Integration of BI analytics with market research and consumer insights

Enterprise Data Warehousing

Arkansas Blue Cross and Blue Shield is the largest health insurer in Arkansas. It has two wholly owned subsidiaries that operate more than a dozen affiliates and a charitable foundation.

Arkansas Blue Cross is one of 39 members of the Blue Cross and Blue Shield Association. Blue Health Intelligence (BHI), a collaborative effort between 19 participating Blue Plans, is managed by the BHI Project Management Office (PMO) housed in the Blue Cross and Blue Shield Association. Arkansas Blue Cross and other affiliated Blue Plans founded BHI after realizing that they would be better able to meet the reporting needs of large national customer groups by working together.

To remain competitive in local markets, Blue Plans needed a national perspective of its business data. Nineteen sister Blue Plans agreed to aggregate medical and drug claims, membership (54 million lives), and provider information into a centralized data warehouse, complementing rather than replacing individual Blue Plans’ local data warehousing efforts.

The result, BHI, is a healthcare database built to improve healthcare benchmarking and national account reporting; provide best practices identification opportunities; and research and manage national healthcare trends in order to improve Blue Plan member healthcare, reduce associated healthcare costs, and refine the viability of Blue Plans on a national basis. The BHI initiative also guards patient privacy, confidentiality, and regional Blue Plan licensee service area restrictions. This enterprise data warehousing initiative demonstrates that partnerships can create a powerful competitive advantage by combining individual Plans’ regional data sets.
Government and Non-Profit
Co-winner: Centerstone Research Institute

The Centerstone Research Institute (CRI) is a private, not-for-profit company dedicated to improving healthcare delivery through the marriage of research and information technology. Based in Tennessee and Indiana, CRI works with the community mental health centers of Centerstone to conduct clinically relevant research and provide high-quality services to more than 70,000 individuals with mental illness. For decades, CRI researchers and affiliated community mental health centers have conducted hundreds of service and clinical studies to secure more than $50 million in federal and private funding. The purpose of CRI's BI/DW solution was to empower end users, who previously had no access to data, with actionable information to inform their business management and clinical practices.

Like many other community behavioral health providers, Centerstone faces increasing pressure to keep costs down and increase output. In addition, Centerstone has limited financial resources to invest in an enterprise BI solution. The bulk of the data warehouse infrastructure relies on open source technologies (Postgres, Jaspersoft, Pentaho, and KNIME) combined with vendor solutions that add value in targeted areas such as dashboards (Qlikview) and predictive modeling (SAS, SPSS).

End users can now see and explore vital information related to service quality, financial viability, and client outcomes. In addition to operational and management tools, predictive models have been developed to better inform clinical care decisions. Finally, CRI’s low-cost model may help other behavioral healthcare organizations to affordably deploy similar solutions, or CRI's data warehouse might be extended to provide similar functionality for other healthcare providers.

Operational BI
Co-winner: Health Care Service Corporation (HCSC)

Health Care Service Corporation (HCSC) is BlueCross BlueShield of IL, TX, NM, and OK, a customer-owned health benefits company focused on improving the health and wellness of its members and communities through accessible, cost-effective, quality healthcare.

HCSC’s Data Movement Integration Hub (DMIH) and Operational Data Store (ODS) solution acquires, integrates, governs, and makes accessible in near real time the operational data that runs the company. This solution supports a business event–driven architecture and high volume/availability application-to-application integration; it supports operational reporting/analytics as well as feeding more strategic solutions such as the enterprise data warehouse (EDW). This solution provides trusted, consistent, and governed operational data to the primary business processes that run the company, and keeps information center stage in operational/strategic decision making.

The importance and success of the EDW crystallized the critical need for the business to have strategic information to make decisions and use within its processes. HCSC realized it had to approach information as a strategic asset outside of the EDW arena. The Enterprise Information Strategy and Management division (EISM) was created to support this
view, and several standards and processes were defined as part of a large governance and stewardship effort.

The governance team developed high-level models such as information value chains, business information models, and the enterprise logical data model. However, the cornerstone to implement this vision was a platform capable of providing high-level standardized data consistently and in a timely manner for business operations. The team accomplished this by developing the Data Movement Integration Hub and the Operational Data Store.

**Operational BI**

**Co-winner: Quicken Loans Inc.**

Quicken Loans is the nation’s largest online home mortgage lender; it closes loans in all 50 states and is among the country’s 10 largest retail lenders.

At Quicken Loans, real-time BI is a necessity. Today’s economic climate has a great impact on its success. With changing lending guidelines, new products, and fluctuating interest rates, business users must have data at their fingertips quickly. The company’s operational data warehouse is focused on providing visibility to the constantly changing business at Quicken Loans. Its purpose is to provide right-time, actionable data and analysis to a wide range of users around the clock via a centralized BI Web portal called BIG (BI Gateway), key performance indicators (KPIs) and dashboards, and direct access to cubes via ProClarity and Excel.

This operational BI initiative allows users to quickly make highly accurate decisions based on near-real-time reports. Users have learned to expect reports minutes after the data has entered the operational system; the concept of system downtime is unacceptable.

In the past year, Quicken Loans has maintained its position as the number one online lender and witnessed record-breaking loan volumes and strong overall growth. The rock-solid BI/DW platform was critical to the company’s tangible success.

**Predictive Analytics**

**Winner: Advanceit**

SOLUTION SPONSOR: IN2CLOUDS

Advanceit is the first and only Canadian source of merchant cash advances. The company works with approved debit and credit card processors to provide merchants with business financing based on their electronic payment sales, providing small and midsize businesses with a flexible way to grow without impacting cash flow and helping them avoid the difficulties associated with traditional bank loans.

The global financial crisis of 2008–10 created strong demand for Advanceit’s services and products. The company needed to overhaul its sales process to leverage predictive analytics throughout the loan application process and rely less on gut feel and historical reports for approvals. Another goal was to increase sales and underwriting capacity without increasing headcount.

Advanceit created an operational BI system that uses advanced analytics to predict the risk and profit of a business loan application; optimize the risk/profit mix of its loan portfolio; provide real-time scores to prioritize its sales team’s activities; and recommend actions for each application based on its risk/profit score.

Advanceit’s analytics system has reduced the company’s bad debt expense by two-thirds and is on track to achieve an ROI in excess of 5,000 percent. The company has increased underwriting efficiency by 100 percent, cut its risk exposure in half, and increased sales team efficiency by 33 percent—all without adding staff.

**Radical BI**

**Winner: Celestica**

Celestica is a US$6.1 billion global leader in the electronics manufacturing services (EMS) industry. Celestica delivers innovative supply chain solutions to leading original equipment manufacturers (OEMs) in the enterprise computing, communications, consumer, industrial, green technology, aerospace and defense, and healthcare markets.

EMS companies typically own significant amounts of cross-industry product lifecycle and supply chain data; Celestica recognized the opportunity to leverage this data to help the company and its customers succeed in their markets. Having identified the potential of what business analytics could bring to the company, Celestica launched an ambitious enterprisewide analytics program in early 2009. The objective was to be one of the first companies in the EMS industry to leverage analytics to drive business improvements and to create a competitive advantage for Celestica’s customers and key stakeholders.

The company created a non-traditional, hybrid business analytics center of excellence (COE) that delivers a wide range of business benefits across all core functions at Celestica. Within six months of implementing the center of excellence, Celestica’s analytics program was internally
considered a strategic and competitive capability. Within
nine months, Celestica had conducted a rapid proof of
concept (POC) to drive program buy-in; created a hybrid
analytics COE that combines quantitative modeling plus
traditional IT talent; implemented SAP BusinessObjects
and SPSS Clementine as its core analytics platform;
and delivered several analytics projects that generated
widespread excitement throughout the company and made
significant business impact across all key business areas.

TDWI thanks this year’s panel of expert judges:

Barb Wixom, Associate Professor, University of Virginia
Claudia Imhoff, President, Intelligent Solutions, Inc.
Dan Evans, CBIP, Sr. Group Manager, BI Practice, Avanade, Inc.
Evan Levy, Partner, Baseline Consulting
Hugh Watson, Professor of MIS, University of Georgia
Jill Dyché, CBIP, Partner, Baseline Consulting
Jim Thomann, Principal Consultant, DecisionPath Consulting
John Bair, CTO, LaunchPoint
John O’Brien, President, Zukeran Technologies Inc.
Jonathan G. Geiger, CBIP, Executive Vice President,
Intelligent Solutions, Inc.
Justin Manes, Consultant
Laura Reeves, Principal, StarSoft Solutions
Mark Pecó, CBIP, Partner, InQvis
Maureen Clarry, President/CEO, CONNECT:
The Knowledge Network
Mike Lampa, Sr. Manager, Enterprise BI, Dell, Inc.
Nancy Williams, CBIP, Vice President, DecisionPath Consulting
Patty Haines, President, Chimney Rock Information Solutions
Philip Russom, Senior Manager, TDWI Research, TDWI
Sid Adelman, Principal, Sid Adelman & Associates
Steve Dine, President, Datasource Consulting, LLC
Steve Williams, President, DecisionPath Consulting
Tony Lopykinski, Managing Principal, Maven Advisors, LLC
Wayne Eckerson, Director, TDWI Research, TDWI
BI SOLUTIONS
Transforming Technologies

Our sponsors present their solutions in the following business intelligence categories:

- Analytics and Reporting
- Business Intelligence and Data Warehousing
- Dashboards, Scorecards, and Visualization
- Data Management
- Data Integration
- Enterprise Business Intelligence
- Predictive Analytics

Acxius
www.acxius.com

**BI CATEGORY: Business Intelligence and Data Warehousing**

As a best-in-class consulting firm, Acxius serves clients around the globe, providing high performance, intelligent, user-friendly, scalable solutions for their big and complex data and information challenges.

Acxius delivers full lifecycle, high-value, quality results that allow clients to achieve goals in an increasingly competitive marketplace.

**Data management:** Providing clients with seamless access to and integration of data.

- Enterprise data strategy and planning
- Enterprise data architecture
- Enterprise data warehouse and data marts
- Data governance
- ETL/data movement/data integration
- Metadata management
- Master data management (MDM)

**Business performance management:** Leveraging data as a consistent, effective way to assess business health.

- Business performance measures/KPIs
- Process improvement

**Information management:** Providing user-friendly access to the right data at the right time.

- Enterprise information strategy and planning
- Enterprise information architecture
- Business intelligence
- Customer analytics
- ERP and SCM analytics
- Financial analytics
- Predictive analytics

**Project management:** Delivering in scope, on time, and on budget.

- Thought leadership
- Program management/PMO
- Change management
**Birst**
www.birst.com

**BI CATEGORY:** Analytics and Reporting

Birst accelerates business results by deploying fast, powerful, and agile business intelligence solutions for its customers. Birst overcomes the traditional cost, complexity, and performance barriers of business intelligence with rapid, flexible solutions that simultaneously improve the reach and power of analysis in an organization.

Birst customers enjoy the benefits of software-as-a-service delivery, including subscription pricing and not having to purchase hardware and software. The IT department can deploy BI more quickly and with less labor using Birst’s automated creation of physical and logical data models. The IT department can also save labor by allowing end users to generate and share their own reports and dashboards with Birst’s easy browser-based user interface.

Birst is offered as a subscription service that includes all the elements of a full business intelligence software suite—from fully integrated ETL to ad hoc query to reporting and dashboards—as well as the computing and storage hardware. Birst users buy only what they need, then easily and rapidly scale up or down as needs change.


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**DataFlux**
www.dataflux.com

**BI CATEGORY:** Data Management

DataFlux provides industry-leading data management solutions that meet the needs of both business and IT users, allowing organizations to effectively guide data quality, data integration, master data management (MDM), data governance, or any other data initiative.

DataFlux enables business agility and IT efficiency by providing innovative data management technology and services that transform data into a strategic asset. DataFlux helps organizations manage critical data through award-winning technologies and time-tested expertise.

By combining data management capabilities into a unified platform, DataFlux helps companies deliver reliable, trusted data across the enterprise so that informed business decisions based on accurate data can be made. Smart companies don’t just use their data to survive; they use data to drive the business forward and thrive.

DataFlux provides the power to build a foundation for business success. With the DataFlux Data Management Platform, you have the power of data quality, data integration, and MDM at your fingertips. The unified development and delivery environment—developed on a single code base instead of a patchwork of acquisitions and partnerships—helps business and IT work together on critical aspects of data management.
Information Builders
www.informationbuilders.com

**BI CATEGORY:** Enterprise Business Intelligence

Information Builders’ software and services enable a complete, end-to-end information strategy that streamlines processes and fosters smarter decision making for leading organizations worldwide. The company’s software is installed in tens of thousands of locations and services millions of users. The WebFOCUS business intelligence (BI) platform provides massively scalable information applications, analytics, and customer-facing portals that deliver game-changing business results to the new generation of information users. iWay Software integration solutions allow enterprises to leverage all of their information resources to streamline internal and business-to-business processes while escalating the overall accessibility and integrity of information regardless of environmental complexity. iWay’s data governance tools provide real-time data profiling, cleansing, and monitoring capabilities that allow companies to catch errors as transactions occur, and before they have a chance to infiltrate the vital systems on which they rely. Headquartered in New York City with 60 offices worldwide, Information Builders employs 1,350 people and has established significant industry partnerships.

Jaspersoft
www.jaspersoft.com

**BI CATEGORY:** Enterprise Business Intelligence

End-to-End BI for Any Size Company

**JASPERSOFT’S CORE BI CAPABILITIES**

**End-user query, reporting, and analysis:** Powered by Web-based technologies, users can create their own ad hoc queries, reports, and analyses—without IT intervention.

**Dashboards and mash-ups:** End users can design, configure, and deploy their own interactive BI dashboards and mash-ups in minutes.

**Production reporting:** Generate and distribute Web and printable invoices, forms, and all varieties of complex reports from production systems.

**Data integration:** Develop, manage, and execute data integration processes for accurate and comprehensive reporting and analytics.

**Data analysis:** Whether you want to explore your data in-memory or in a powerful, expressive OLAP server, Jaspersoft’s data analysis does the work that would be too difficult, time-consuming, or expensive to perform using standard SQL-based reporting.

**ROBUST, SECURE, AND ENTERPRISE READY**

- Embedded or standalone
- Leverages existing IT infrastructure servers and services
- Deploys quickly for rapid time to value
- Internationalized and localized for global deployments

**AFFORDABLE COMMERCIAL OPEN SOURCE**

**Power of community:** Developers and businesses truly appreciate and participate in worthwhile open source projects, which collectively improves the power and functionality of the products.

**Backed by a commercial company:** Providing commercial licensing, enhanced functionality, certification, support, warranties and indemnification, documentation, training, and expert professional services.

**Lowest TCO:** The open source subscription model provides the lowest cost, pay-as-you go solutions for your critical BI needs.
PivotLink
www.pivotlink.com

**BI CATEGORIES:** Analytics and Reporting; Dashboards, Scorecards, and Visualization; Enterprise Business Intelligence

PivotLink helps you build a stronger, more responsive business within weeks. Our easy-to-use analytical solution empowers business decision makers across your organization and value chain with actionable, consumable information.

Delivered as a service, our BI platform combines data regardless of the format from any onsite or off-site source. The PivotLink BI Platform is the only enterprise-proven, IT-friendly business analytics solution in the cloud. Our customers benefit from a platform that is flexible enough for non-IT users to easily adapt their own reports, dashboards, and analysis to changing business dynamics quickly and efficiently.

PivotLink was built from the ground up to scale, simplify data integration, and improve manageability while supporting corporate governance standards for a lower total cost of ownership.

ReadiMetrix—our suite of packaged industry and process-specific KPIs, dashboards, and best-practice metrics for retail, online marketing, sales, marketing, and human resources—powers our unique metrics-driven approach to business decision making.

PivotLink’s platform powers roughly 2,000,000 ad hoc reports and dashboards for more than 15,000 PivotLink users each month. Customers include Macy’s, REI, Novell, Party City, CamelBak Products, Car Toys, Guardian Home Care Holdings, Inc., Rossignol, Shaklee, Taleo, and Zones.

Spotfire, TIBCO Software Inc.
spotfire.tibco.com

**BI CATEGORIES:** Analytics and Reporting; Dashboards, Scorecards, and Visualization; Predictive Analytics; Enterprise Business Intelligence

TIBCO Software Inc. (NASDAQ: TIBX) is a leading provider of enterprise analytics software for next-generation business intelligence. Spotfire Analytics products offer a visual and interactive experience that helps professionals quickly discover new and actionable insights in information. Distinguished by its speed to insight and adaptability to specific business challenges, Spotfire rapidly reveals unseen threats and new opportunities, creating significant economic value. Spotfire Analytics customers include industry leaders among the Global 2000 that have deployed Spotfire Analytics to gain an information advantage over their competitors.

Spotfire Analytics software equips users throughout the enterprise—whether in critical business, technical, or scientific roles—to freely analyze data and create analytic applications and interactive dashboards. Spotfire Analytics delivers a unique combination of powerful analytics and an engaging visual experience that is both powerful and intuitive. Spotfire Analytics gives end users more control, which speeds “time to answers” while reducing typical bottlenecks within IT when building new business intelligence reports or reconfiguring databases. And unlike traditional business intelligence systems, Spotfire Analytics is completely adaptable to business processes across the organization, giving IT an extensible analytics platform and reducing the number of custom and packaged applications IT must support.
Tableau

www.tableausoftware.com

**BI CATEGORIES:** Analytics and Reporting; Dashboards, Scorecards, and Visualization; Enterprise Business Intelligence

Looking for browser-based business intelligence that moves fast? Try Tableau Software’s rapid-fire business intelligence tools.

Tableau lets you combine all the data you need into a powerful dashboard, then publish it on the Web so you can filter, highlight, and drill down right in a browser. Embed it in your team’s workspace or SharePoint site, or send a link via e-mail. Update it in real time. And do it in minutes or hours, not months.

With Tableau, you can move from tables to interactive visualizations to dashboards in a few clicks. And you can give colleagues, customers, and partners the tools they need to answer their own questions simply by logging into a secure Web site.

Tableau is made up of two tools. Business people use Tableau Desktop to analyze data. It takes only a few clicks to connect to your data, and only a few more to create dashboards and reports. It’s so easy to use that any Excel user can learn it. And it’s 10–100 times faster than existing solutions.

Publish dashboards to Tableau Server for browser-based analytics that anyone can learn and use. Executives and people in the field can access interactive dashboards simply by clicking on a link. Tableau Server is easy to set up and administer and fits with existing security and infrastructure, including Active Directory.

Talend

www.talend.com

**BI CATEGORY:** Data Integration

Talend is the recognized market leader in open source data management and application integration. After three years of intense research and development investment, and with solid financial backing from leading investment firms, Talend revolutionized the world of data integration when it released the first version of Talend Open Studio in 2006.

Talend’s data management solutions portfolio now includes data integration (operational data integration and ETL for business intelligence), data quality, and master data management (MDM). Through the acquisition of Sopera in 2010, Talend also became a key player in application integration.

Unlike the small—and quickly consolidating—number of traditional vendors offering proprietary, closed solutions, which can only be afforded by the largest and wealthiest organizations, Talend offers a completely new vision. The company shatters the traditional proprietary model by supplying open, innovative and powerful software solutions with the flexibility to meet the needs of all organizations. Talend makes middleware solutions available to organizations of all sizes, for all their integration needs.
TDWI, a division of 1105 Media, Inc., is the premier provider of in-depth, high-quality education and research in the business intelligence and data warehousing industry. TDWI is dedicated to educating business and information technology professionals about the best practices, strategies, techniques, and tools required to successfully design, build, maintain, and enhance business intelligence and data warehousing solutions. TDWI also fosters the advancement of business intelligence and data warehousing research and contributes to knowledge transfer and the professional development of its Members. TDWI offers a worldwide Membership program, five major educational conferences, topical educational seminars, role-based training, onsite courses, certification, solution provider partnerships, an awards program for best practices, live Webinars, resourceful publications, an in-depth research program, and a comprehensive Web site: tdwi.org.

**MEMBERSHIP**

tdw.org/membership

In a challenging and ever-changing business intelligence and data warehousing environment, TDWI Membership offers a cost-effective solution for maintaining your competitive edge. TDWI will provide you with a comprehensive and constantly growing selection of industry research, news and information, online resources, and peer networking opportunities developed exclusively for its Members. TDWI offers a cost-effective way to keep your entire team current on the latest trends and technologies. TDWI’s Team Membership program provides significant discounts to organizations that register individuals as TDWI Team Members.

**WORLD CONFERENCES**

tdw.org/conferences

TDWI World Conferences provide a unique opportunity to learn from world-class instructors, participate in one-on-one sessions with industry gurus, peruse hype-free exhibits, and network with peers. Each six-day conference features a wide range of content that can help business intelligence and data warehousing professionals deploy and harness business intelligence on an enterprisewide scale.

**SEMINAR SERIES**

tdw.org/seminars

TDWI Seminars offer a broad range of courses focused on the skills and techniques at the heart of successful business intelligence and data warehousing implementations. The small class sizes and unique format of TDWI Seminars provide a high-impact learning experience with significant student-teacher interactivity. TDWI Seminars are offered at locations throughout the United States and Canada.

**CHAPTERS**

tdw.org/chapters

TDWI sponsors chapters in regions throughout the world to foster education and networking at the local level among business intelligence and data warehousing professionals. Chapter meetings are open to any BI/DW professional. Please visit our Web site to find a local chapter in your area.

**ONSITE EDUCATION**

tdw.org/onsite

TDWI Onsite Education is practical, high-quality, vendor-neutral BI/DW education that can be put to use immediately. With TDWI Onsite Education, you maximize your training budget as your team learns practical skills they can apply to current projects—with Onsite training tailored to their specific needs.

**CERTIFIED BUSINESS INTELLIGENCE PROFESSIONAL (CBIP)**

tdw.org/cbip

Convey your experience, knowledge, and expertise with a credential respected by employers and colleagues alike. CBIP is an exam-based certification program that tests industry knowledge, skills, and experience within four areas of specialization—providing the most meaningful and credible certification available in the industry.

**WEBINAR SERIES**

tdw.org/webinars

TDWI Webinars deliver unbiased information on pertinent issues in the business intelligence and data warehousing industry. Each live Webinar is roughly one hour in length and includes an interactive question-and-answer session following the presentation.