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2006 IN REVIEW

PLUS: TEN TRENDS TO WATCH IN 2007
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## ABOUT TDWI
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EDITORIAL DIRECTOR’S NOTE

Welcome to the fourth annual TDWI’s Best of Business Intelligence: A Year in Review. Each year we select a few of TDWI’s best, most well-received, impact-full articles, research, and information, and present them to you in this publication.

Stephen Swoyer kicks off this issue with a review of recent major BI developments. “Best in Show: 2006 in Review” takes a look back at this “year of disruption,” discussing software as a service, mainstream BI suites, and the metamorphosis of data warehousing. And he asks: Are we finally starting to see BI for the masses?

In “Ten Trends to Watch in 2007,” TDWI’s research director Wayne Eckerson takes a look into the future. A few of the hot trends we’ll see in 2007 include BI search, the morphing of ETL into the universal integration platform, and the use of dashboards to monitor and manage performance.

To represent TDWI Research, we’ve provided excerpts from two of the past year’s Best Practices Reports. “Predictive Analytics” shows you how to extend the value of your data warehousing investment, including five specific recommendations for implementing predictive analytics. “Deploying Dashboards and Scorecards” explains how performance management and business intelligence converge, along with the benefits and best practices surrounding the use of performance dashboards.

In “Four Strategies to Broaden BI Adoption,” our selection from the Business Intelligence Journal, Harriet Fryman takes a look at why only 18 percent of potential BI users actively use BI tools, and provides four comprehensive strategies to help organizations drive broader information use. This volume’s Ten Mistakes to Avoid will help you to create a BI center of excellence while avoiding some common pitfalls. And thanks to columns from TDWI’s three e-newsletters, you’ll learn about the impact of open source on DW and BI; experience the nightmares of BI pricing (and learn how to move from the nightmare to reality); find out how to put the business back into BI; and take another look at the brave new world of BI as it goes mainstream.

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 4.
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By any standard, 2006 was a year of disruption. New application
development and delivery paradigms burst onto the scene, even as
traditional software development achieved its arguable apotheosis in
the all-in-one BI suite.

Elsewhere, Microsoft, SAP, and other software heavyweights shrugged
off their smiles, threw down their gloves, and served notice that they
had arrived as cutthroat BI competitors.

Meanwhile, the shape and scope of data warehousing itself under-
went significant changes last year, as increasingly rapacious data
access requirements and emerging technologies challenged the DW
status quo.

Another trend—the ageless BI-for-the-masses mantra—revived itself
in 2006. The good news, industry watchers say, is that it’s now less a
canard than an inevitability.

BY STEPHEN SWOYER
SaaS Breaks Out
Software-as-a-service (SaaS) was well on its way to becoming a big underground success in the BI space—until it went supernova last year. It started with market watcher International Data Corp. (IDC) predicting a substantial surge on the SaaS front—including, IDC suggested, a big SaaS move by fat-client king Microsoft.

Microsoft’s big SaaS move turned out to be more of a little SaaS whimper—the software giant announced a Web services integration layer for its Dynamics (ERP) application architecture—but there were SaaS moves aplenty in other quarters. Oracle continued to flesh out its SaaS BI stack, while ERP giant SAP announced its first-ever SaaS CRM offering early last year, followed by Business Objects SA (with crystalreports.com), Informatica, and others. A host of start-ups are plying the SaaS trade, too: Host Analytics, Ketera Technologies, Oco, Inc., and many others.

SAAS DIDN’T JUST BURST OUT OF NOWHERE IN 2006, BUT SEEMED SUDDENLY TO CATCH FIRE.

Nor is SaaS fever likely to abate anytime soon. Consider a recent study from Gartner—that other market watcher to watch—which suggests that SaaS is primed for enormous expansion. Gartner says that SaaS offerings will account for nearly one-quarter of all software revenues by 2011; that’s roughly a 500 percent increase from last year’s SaaS totals.

And that’s the salient point, isn’t it? SaaS didn’t just burst out of nowhere in 2006, but—in the BI space, at least—seemed suddenly to catch fire. What changed, and why? SaaS players list a number of reasons, which vary according to their dependency on SaaS revenues. SaaS start-ups will tell you that software-as-a-service is a disruptive, game-changing paradigm. Independent software vendors (ISV) veterans tend to spin the issue very differently: SaaS is an important software delivery model, they acknowledge, but it’s not necessarily game-changing. It’s complementary. It has its place: It’s niche-y.

Either way, SaaS forces ISVs—and a surprising number of BI ISVs, at that—to be more responsive to customer needs. It also creates pricing pressure, forcing largely content BI ISVs to revise costly licensing schemes. But SaaS is not a replacement for on-premises application software.

“SaaS is becoming more pervasive, no question about that,” agrees Mike Schiff, a principal with data warehousing consultancy MAS Strategies. “There were [SaaS] moves by SAP, Informatica, and Business Objects, which did that thing with Crystal Reports On Demand and then went out and acquired a SaaS infrastructure provider [Nsite]. So people—the vendors—are taking this seriously now.”

That’s about as much SaaS triumphalism as Schiff is willing to endorse, however. “It’s a win-win situation, for customers and [vendors]. I don’t think it’s going to necessarily steal people from one model, but it’s very attractive to [small and midsize businesses], for example, because it promises them turnkey BI. So I think the net effect is going to be [growth of] the market with BI products, because companies that simply used spreadsheets before can now get the power of real BI tools.”

What we saw last year, Schiff says, was a case of the big BI ISVs taking the SaaS plunge. But one shouldn’t expect BI application delivery models to be wholly transformed by the software-as-a-service wave: if anything, off-premises and on-premises BI solutions can and should coexist.

As SaaS offerings mature and become more tightly coupled to—and in many cases transparently interoperable with—on-premises software, a kind of equilibrium or conventional wisdom will set in. “[SaaS] doesn’t pose any real danger to how [BI ISVs] do business. If anything, it’s an opportunity for them. And what you saw last year was some of these vendors coming to terms with that,” Schiff concludes.

BI Suites Go Mainstream?
An orthogonal development to the SaaS wave is the all-in-one BI suite, which—following a late-2005 push from Business Objects, Cognos, Hyperion Solutions Corporation, and other BI powers that be—seems finally to have come into its own. In many ways, the BI suites of today can be seen as the apotheosis of traditional trends in software development: they consist of big, meaty back-end applications married to both fat (conventional) and thin (Web-based) client front-ends. In comparison with their predeces-
sors, they boast better overall integration and a more consistent user experience—especially on the metadata and security fronts. In other respects, however—particularly with regard to user interface (UI) consistency—the “highly integrated” BI suites of today aren’t quite as integrated as one might expect.

They are a clear improvement over their predecessors, which—like the SAP R/3 ERP suite of old—were difficult to implement and maintain on an ongoing basis. Part of this is because many erstwhile BI offerings—even many so-called “BI suites”—were frequently cobbled together from a range of different point solutions, or (even more frequently) from third-party acquisitions.

“Through both acquisition and innovation, a single vendor may now offer a much broader range of products to serve a full spectrum of users’ needs,” writes Cindi Howson, a principal with BIScorecard.com, in a recent assessment of suite offerings from Business Objects, Cognos, and Hyperion. “For the most part and from a historical perspective, these individual modules were not well integrated. Users had to learn multiple tools and go to different sources to access content; IT had to maintain multiple software versions, servers, security schemes; and so on.”

In this respect, Howson and other analysts agree, the big BI suites of today do constitute a significant improvement over the cobbled-together BI offerings of old. And while few if any BI vendors can claim to offer best-of-breed capabilities across the breadth of their suite offerings, the features and functionality they do offer, coupled with the real gains they have made in tightening up integration between and among suite components, amounts to an attractive alternative to best-of-breed, single-use tools. At the same time, not everyone seems convinced that the all-in-one BI suite is a done deal.

“Although the movement to the full suite looked promising,” says Tony Politano, author, lecturer, and partner with BI consultancy BusinessEdge Solutions. “[I]t looked like the stars were being aligned for 2006 to be the year of mobilization.”

But something happened on the way to heaven, Politano says. “The mobilization did not reach full steam as expected. Much of the customer experience I have encountered has still been focused on the components,” he points out.

From Politano’s perspective, true integration—or true all-in-one-ness—might depend on additional BI consolidation: “My fear is that the only way to get the true mobilization may be further consolidation in the vendor space.”

That’s Schiff’s take, too. One upshot of further consolidation, Schiff indicates, is that it makes tightly coupled integration something of a moving target: a vendor no sooner finishes integrating the assets from one acquisition—a process that frequently takes years—than it must subsume those of another, or of several.

“No one’s suite is totally integrated,” Schiff says. “There’s a reason for that. Suites tend to be dynamic: they grow dynamically as companies acquire additional technologies in addition to what they have. The new stuff is stuff they have to integrate in. Take Business Objects—they just keep on doing acquisitions, and they have to integrate those. Or look at Informatica, which bought data quality [Similiarity Systems, early last year] and then some unstructured stuff [Itemfield] just a few months ago. They’re going to have to integrate the unstructured stuff they bought. So suites are going mainstream—but suites themselves are still a moving target. There are always going to be places where integration lags.”

FUTURE MARKET AND TECHNOLOGY HISTORIANS MIGHT ONE DAY IDENTIFY 2006 AS THE YEAR IN WHICH SEVERAL TRENDS BEGAN TO RESHAPE THE SCOPE AND PRACTICE OF DW AS WE KNOW IT.

The Metamorphosis of Data Warehousing?
The BI space itself is always changing. That’s a given. The evolution of SaaS and the emergence of the all-in-one BI suite as a compelling alternative to best-of-breed BI are but two examples of such change. But is what we call “business intelligence” in the midst of fundamental change? In other words, is the infrastructure that underpins BI experiencing transformative, perhaps even radical, change?

Future market and technology historians might one day identify 2006 as the year in which several (related and unrelated) trends began to reshape the scope and practice of DW as we know it.
Consider the growth and maturation of data warehousing appliances, which promise—and in some cases might even deliver—turnkey data warehousing. Or the increasing ubiquity of DW tools: canned ETL capabilities ship with all major RDBMSes (although IBM’s DB2 relational database still offers only a comparatively limited ETL capability), and both Microsoft and Oracle offer database-centric ETL tools that boast canned data quality and data cleansing capabilities, too.

Then there’s the emergence of enterprise information integration (EII) as a complement—or, in some cases, as an alternative—to traditional data warehouses. EII’s killer app is almost certainly frequently refreshed reporting, and, in this sense, it has emerged as a clear complement to traditional DW practices. But there’s another sense in which EII comprises a “good enough” data access solution for some customers.

Other disruptions include the emergence of master data management (MDM) as a kind of super DM practice that subsumes (or seems to subsume) data warehousing, data quality, and other disciplines, along with the increasing emphasis on right-time data access. The latter requirement, in particular, seems to be pushing ever closer to the real-time envelope.

So what does it all add up to? Or, to put it another way: are we transitioning to a kind of DW environment that—in a few years’ time, anyway—will bear little resemblance to the fiercely contested Inmon or Kimball visions of old?

Veteran industry watchers don’t seem to think so. DW itself might be changing—it’s always changing, they point out—but if history is any indication, data warehousing practices adapt to change; they’re never overwhelmed by it.

“DW has been constantly morphing since the mid-90s. This is what makes it such an exciting area. The movement from DW to BI to [corporate performance management] was a logical progression [that added] new business and technical functionality [which] seems to have fared well,” comments Politano.

Politano isn’t entirely sanguine about the pace of change in the DW space. “MDM, though, can upset the apple cart on this. MDM strikes at the heart of DW, causing a rethinking of the methods, tools, and technologies that come into play,” he notes. At the same time, the transition to MDM—like those from vanilla data warehousing to BI, and from BI to CPM—could be a good thing, too, Politano concludes. “It is also my hope that if branded under MDM, that data quality will get an even greater adoption, as this is the Achilles’ heel of any DW.”

**BI for the Big Guys**

It seemed as if the big software vendors—Microsoft, Oracle, SAP, and even IBM—were unusually willing to talk about their BI aspirations last year.

Microsoft officials, for example, said they didn’t see any reason customers should have to shop elsewhere for their BI needs. Ditto for Oracle and SAP. IBM continues to tread a much finer line, of course, but its interest in controlling the information management middleware tier seems clear.

Forthrightness of this kind is a change. It isn’t as if these vendors didn’t have sky’s-the-limit ambitions before, but why are they suddenly so willing to talk about them? What conditions have changed? Is it merely a natural evolution of their own product development and go-to-market strategies? If so, its synchronicity may be explained by competitive copy-catting: one vendor ups the ante, marketing-rhetoric-wise, and other vendors quickly follow. Or is it, instead, a natural evolution of the marketplace, or of customer expectations?

Consider Microsoft, for example, which—only months after it shipped a BI-laden refresh of its SQL Server RDBMS in December of 2005—snapped up BI pure-play vendor ProClarity. Shortly after the ProClarity coup, Microsoft officials suddenly became a lot more forthcoming about their BI aspirations. “In the past] if there was this hole that people perceived Microsoft [as] having, they’d say to us, ‘Yeah,
you don’t have this, therefore I need to go look at Business Objects or Cognos. I don’t want them to have that conversation,” Alex Payne, a senior product manager in the Office business applications group, told TDWI last May.

Ditto for Oracle—the first member of the Enterprise Software Gang of Four to really come out swinging last year. In March, for example, Oracle announced its new Business Intelligence Suite, a revamped, enlarged, and Project Fusion-ized version of the erstwhile Oracle Business Intelligence offering.

Oracle’s new BI suite came wrapped in an ambitious new vision—one in which Oracle-the-BI-power (and not Oracle-the-collegial-partner-of-best-of-breed-BI-players) was most prominently featured. Oracle followed up its BI Suite gambit by shipping a new and wholly revamped version of its Warehouse Builder ETL tool, even as Oracle officials increasingly talked up Oracle’s aspirations in the broader (extra-Oracle 10g) enterprise ETL space. Then—in October—Oracle snapped up standalone ETL specialist Sunopsis.

SAP didn’t rest on its laurels last year, either. It announced its first foray into software-as-a-service (SaaS) CRM in February, for example; expanded its BI footprint by introducing additional vertical-specific analytic applications; shipped a new drag-and-drop application development environment (Visual Composer) designed to facilitate the development of composite applications; fleshed out its Duet SAP/Office integration effort with Microsoft; and helped encourage the emergence of an ecosystem of lightweight business analytic applications, dubbed xApps, that are designed by customers, partners, and other stakeholders. Add it all up, SAP officials say, and you’ve got a company that’s ready to take its rightful place as a tier-one BI vendor.

“‘There’s always been this kind of expectation that when the big guys [SAP, Oracle, and Microsoft] got their acts together, it was going to be very difficult for the standalone players,’” SAP senior vice president and analytic GM Sanjay Poonen told TDWI recently. “Our investment in the analytics area, our recruiting of top talent, our commitment from the top down to analytics—we’ve been executing on our analytic vision, and the growth you see is a result of that.”

IBM is something of a special case. It doesn’t have the same database-centric BI strategies as its two fiercest rivals (Microsoft and Oracle), but seeks, instead, to control the information management middle tier.

This layer is fiercely contested by a host of BI, enterprise application integration (EAI), and enterprise applications players, too. Informatica, Information Builders, Business Objects, and SAS Institute, to name just a few, all vie for dominance in the information access space, while IBM dramatically ratcheted up its own information middle-tier ambitions last year, announcing IBM Information Server, a largely synthetic deliverable that includes not just ETL, data quality, and data profiling capabilities, but also structured and unstructured content management, document management, and service-enablement.

IT SEEMS LIKE WE’VE BEEN WAITING EONS FOR VENDORS TO DELIVER ON THE “BI FOR THE MASSES” PROMISES THAT THEY FIRST STARTED PROFFERING 10 YEARS (OR MORE) AGO.

The salient point, of course, is that last year each of these vendors hitched the evolution (or escalation) of their respective product strategies to an accompanying escalation of their marketing rhetoric, too. Why?

“The revenue opportunity is the driving force,” Business Edge’s Politano argues. “Previously the big players did not need the dependence on BI for revenue growth, [but] with the consolidation in the applications market, BI presents a significant revenue stream.”

Any way you spin it, this is bad news for the BI pure-plays, Politano continues. “The pure-play BI vendor has already become an endangered species, and the aspirations by Oracle, Microsoft, SAP, and IBM have made the environment even more fragile,” he says. “I also believe that by quietly building up the components required for full-blown BI suites, like Microsoft and Oracle have done, they have been able to take a bigger-picture view than the pure-plays, since they did not have to get caught in the technol-
ogy leapfrog games that are so common in the pure-play mode.”

Big-guy BI isn’t by any means a fait accompli, of course, Politano concludes: “[They] will still need to prune their offerings, since they … have multiple BI strategies, such as Microsoft having built-in BI in their Dynamics product line, [and] Oracle having Siebel Analytics as well as their other offerings. But pruning is a heck of a lot easier than acquisition!”

At Last—at Long Last—BI for the Masses?
It seems like we’ve been waiting eons for vendors to deliver on the “BI for the masses” promises that they first started proffering 10 years (or more) ago.

But the past few years have produced demonstrable improvements in usability—or in usability technologies—haven’t they? Over the last 24 months alone, for example, we’ve marked the mainstreaming of highly interactive Web development technologies (Ajax), the growing acceptance (and transition from a Web-mostly play) of Adobe Flash, and the soon-and-inevitably-to-be-mainstreamed interactive performance dashboard. All three technologies gained major ground in 2006, with major BI vendors touting Ajax-powered Web clients, SAP and others embracing Flash for their thin-client application development efforts, and next-generation dashboards starting to gain traction.

But does the mainstreaming (or inevitable mainstreaming) of such technologies constitute a tangible gain in BI usability? Many BI skeptics seem to think so.

“Tools are getting easier to use. What we’re now seeing is a kind of democratization of tools throughout companies. One big driver [of this] is [data] visualization, which is more intuitive than the older [tools]. The visualization piece is just really nice. If you look at a mainstream visualization tool, something like Business Objects’ Xcelsius, it’s just very appealing,” concludes MAS Strategies’ Schiff. “So BI is getting easier to use, and at the same time, organizations are putting in the proper controls to make sure [BI] can be safely exposed to these new users. I do see it getting out more and more to the masses.”

All isn’t sweetness and light, of course. Count Politano as an unreconstructed BI-for-the-masses skeptic. “The traditional argument for BI for the masses was getting to the zero-footprint client. [Now] all vendors have a zero-footprint, and it has not proven to be the mobilizer for the masses,” he comments. Politano waxes skeptical—but not necessarily pessimistic. Widespread BI adoption is possible, he says—and the interactive technologies that came to the fore in 2006 provide a good start, or a sort of primordial seeding ground, for broader BI uptake.

“I believe the zero-footprint is a baseline where more interactive Web technologies can build on. A healthy dose of pragmatic visualization and engaging interaction is the key to push to the masses. Yes, there are technologies to support this, but a rethinking in how we analyze, design, and implement the projects is just as critical,” he argues, noting, for example, that DW and BI tools, along with their de rigueur interfaces, were products of a traditional information engineering methodology.

“At the center of this method was the designing of the screen,” Politano concludes. “In a highly engaging, visually stimulating environment, the experience becomes the design molecule as compared to the screen. This is a big change for the DW practitioners and will be met with resistance, but the user demand will ultimately overcome the IT resistance.”

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Ten Trends to Watch in 2007

BY WAYNE W. ECKERSON

Business intelligence rose to the top of the charts in 2006, grabbing the top spot in several executive surveys. With BI going mainstream, many vendors and investors have focused on the discipline as a major area of investment. Assuming the economy keeps expanding, the market for BI products and services in 2007 should be as active and interesting as it was in 2006.

To help you avoid getting blindsided by the future, here are TDWI’s best guesses for what might transpire in 2007.

1. Squeeze Play
Following a year in which Oracle, SAP, Microsoft, and Hewlett-Packard (HP) publicly set their sights on making a splash in the BI market, these vendors will make good on their previous (and future) investments and begin gobbling up market share. Leveraging its account control in large corporations, SAP is squeezing the BI market from the top down, building BI into its NetWeaver platform. Microsoft is pushing up from the bottom by offering rock-bottom prices on a comprehensive BI offering that now spans both its SQL Server and Office product lines. Oracle, which added Siebel Analytics to its already-robust product line, is always a threat, while HP, under the direction of former Teradata chief Mark Hurd, has demonstrated its commitment to BI by introducing the Neoview platform and acquiring BI consultancy Knightsbridge.

2. BI Remodeling
Responding to the incursion of major ERP and platform players, pure-play BI vendors have already shown agility in remaking themselves into more formidable foes. Hyperion, Cognos, and SAS Institute are moving upstream, focusing on delivering comprehensive corporate performance management (CPM) and financial applications running on their BI platforms. After successfully digesting Crystal Solutions, Business Objects is working hard to capture the small and midsize business market with a tightly integrated vertical play (EIM tools plus BI tools), a low-cost dashboard solution (Xcelsius), and on-demand services (crystalreports.com plus Nsite acquisition). Meanwhile, MicroStrategy and Information Builders, who are generally
content to stick to their BI knitting, keep churning high-value features and functions for their installed bases.

3. BI Bailout
Longer term, it seems likely that the BI pure-plays will have to merge or be acquired to obtain the heft and functionality they need to survive. Left to their own devices, it would seem natural for Business Objects and Hyperion to merge, since they have complementary strengths in BI and CPM. Many industry watchers feel that IBM will finally need to acquire a BI player—most likely Cognos—to complete its information-on-demand strategy. There are also rumbles that Information Builders has been in talks with Hyperion and others, but it’s unlikely that the quirky private company, which has a potpourri of data integration and BI technology, will make the leap.

6. On-Demand BI
What is there not to like about software-as-a-service (SaaS)? Subscription-based, all-you-can-eat software that doesn’t require you to buy servers, hire IT professionals, maintain software, or train users takes a big chunk of the cost out of delivering enterprise software…. as long as you can live with standard functionality that can be configured but not customized. The success of salesforce.com has several start-ups ready to launch on-demand BI services in 2007, forcing established BI players to think long and hard about how to respond. Start-ups need to figure out the sweet spot for on-demand BI and convince a skeptical business and IT community to outsource their data to a third party. BI vendors, led by Business Objects—which recently acquired an on-demand vendor (Nsite)—need to figure out how to align two disparate business models—as compatible as oil and vinegar—for selling and servicing BI software.

7. Open Source Litmus Test
Besides on-demand BI, Microsoft’s biggest competition for downmarket (i.e., “free”) BI is open source vendors such as Pentaho, JasperSoft, and Eclipse BIRT. There is no doubt that organizations will use open source software when they need to embed BI into new or existing applications, especially portals or other Web applications, according to Mark Madsen, TDWI faculty member and open source and ETL expert. However, 2007 will show whether open
source BI products have the legs to compete against Microsoft and other packaged BI vendors for sales of bread-and-butter BI capabilities. Madsen thinks open source BI products can compete for sales in greenfield accounts where no BI exists, but will struggle to win enterprise accounts. He also thinks 2007 will reveal which of the many open source business models will ultimately prove successful.

8. BI Search Sizzles
BI search holds the promise of dramatically reshaping how users perform true ad hoc queries. By integrating search engines with BI tools at the API and metadata levels, BI search promises to let users create ad hoc queries that deliver both structured and unstructured data by typing keywords into a search engine, according to Cindi Howson, president of BIScorecard.com and a TDWI faculty member specializing in BI tools. In 2007, several BI vendors plan to demonstrate this functionality and not just talk about it. What remains to be seen is the sophistication of the reports that these tools generate, how tightly they commingle structured and unstructured data, and how much up-front programming is required to pull off this feat. Some skeptics remain waiting on the sidelines (including this author).

9. ETL Morphs into UIP
Last year, ETL vendors traded their batch data warehousing heritage in favor of a more comprehensive data integration strategy that blends ETL with a raft of other acronyms, namely EII, EA1, MDM, and DQM, with more to come. Philip Russom, TDWI’s senior manager of research and services, calls this suite of tools a universal integration platform or UIP. (Some others call it enterprise information management or EIM.) Russom believes that the UIP market will crystallize in 2007, revealing the major players and architectures in the space. He says a UIP may be from a single vendor (IBM’s goal with its IBM Information Server, announced in October 2006), or it may be a kind of “integration grid” that technical users construct with integration tools and hand-coding from multiple sources.

10. MDM Converges
Master data management (MDM) and its first major subject-area instantiation—customer data integration (CDI)—took the BI market by storm in 2006. BI professionals wanted to know how MDM relates to DW and what their role should be in helping their organizations create a reference set of major entities, such as customer, product, and supplier. Most are as confused now as they were in 2006, since most MDM practitioners spout conflicting ideas of what MDM is, how it should be architected, and what a commercial product should offer. According to Dave Wells, TDWI’s director of education, the confusion surrounding multiple definitions and interpretations of MDM will subside in 2007 as definitions and practices converge.

We are lucky to work in a sector of the IT community that is so business-driven, innovative, and diverse. In fact, these three characteristics are all related. Since BI helps business executives, managers, and knowledge workers answer the most fundamental and critical questions they have about their business and future, BI professionals need to deliver innovative and diverse solutions to give the business the best possible chance to get immediate answers to all its questions. If you are a business-minded IT person, BI is the place for you!

Wayne W. Eckerson is the director of research and services for TDWI and author of Performance Dashboards: Measuring, Monitoring, and Managing Your Business (John Wiley & Sons, 2005). He can be reached at weckerson@tdwi.org.
MicroStrategy has set a new standard for enterprise dashboards by combining dynamic data visualization and dashboard interactivity with MicroStrategy’s highly scalable, industrial-strength business intelligence platform.

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What Is Predictive Analytics?

Predictive analytics can help companies optimize existing processes, better understand customer behavior, identify unexpected opportunities, and anticipate problems before they happen. Almost all of TDWI’s Leadership Award winners in the past six years have applied predictive analytics in some form or another to achieve breakthrough business results.

HIGH VALUE, LOW PENETRATION. With such stellar credentials, the perplexing thing about predictive analytics is why so many organizations have yet to employ it. According to our research, only 21% of organizations have “fully” or “partially” implemented predictive analytics, while 19% have a project “under development” and a whopping 61% are still “exploring” the issue or have “no plans.” (See Figure 1.)

Predictive analytics is also an arcane set of techniques and technologies that bewilder many business and IT managers. It stirs together statistics, advanced mathematics, and artificial intelligence and adds a heavy dose of data management to create a potent brew that many would rather not drink! They don’t know if predictive analytics is a legitimate business endeavor or an ivory tower science experiment run wild.

WHERE DO YOU START? But once managers overcome their initial trepidation, they encounter another obstacle: how to apply predictive analytics optimally in their company. Most have only a vague notion about the business areas or applications that can benefit from predictive analytics. Second, most don’t know how to

Status of Predictive Analytics

Fully implemented: 6%
Partially implemented: 15%
Exploring: 45%
No plans: 16%
Under development: 19%

Figure 1. Predictive analytics is still in an early-adopter phase. Based on 833 respondents to a TDWI survey conducted in August 2006.

1 For many years, TDWI recognized the top overall applicant to its Best Practices Awards program with the TDWI Leadership Award for excellence in data warehousing and business intelligence. For more information on this program, visit www.tdwi.org/BPAwards.
Definitions
Before we address those questions, it’s important to define what predictive analytics is and is not. Predictive analytics is a set of business intelligence (BI) technologies that uncovers relationships and patterns within large volumes of data that can be used to predict behavior and events. Unlike other BI technologies, predictive analytics is forward-looking, using past events to anticipate the future. (See Figure 2.)

APPLICATIONS. Predictive analytics can identify the customers most likely to churn next month or to respond to next week’s direct mail piece. It can also anticipate when factory floor machines are likely to break down or figure out which customers are likely to default on a bank loan. Today, marketing is the biggest user of predictive analytics with cross-selling, campaign management, customer acquisition, and budgeting and forecasting models top of the list, followed by attrition and loyalty applications. (See Figure 3.)

VERSUS BI TOOLS. In contrast, other BI technologies—such as query and reporting tools, online analytical processing (OLAP), dashboards, and scorecards—examine what happened in the past. They are deductive in nature—that is, business users must have some sense of the patterns and relationships that exist within the data based on their personal experience. They use query, reporting, and OLAP tools to explore the data and validate their hypotheses. Dashboards and scorecards take deductive reasoning a step further: they present users with a de facto set of hypotheses in the form of metrics and KPIs that users examine on a regular basis.

Predictive analytics works the opposite way: it is inductive. It doesn’t presume anything about the
data. Rather, predictive analytics lets data lead the way. Predictive analytics employs statistics, machine learning, neural computing, robotics, computational mathematics, and artificial intelligence techniques to explore all the data, instead of a narrow subset of it, to ferret out meaningful relationships and patterns. Predictive analytics is like an “intelligent” robot that rummages through all your data until it finds something interesting to show you.

**NO SILVER BULLET.** However, it’s important to note that predictive analytics is not a silver bullet. Practitioners have learned that most of the “intelligence” in these so-called decision automation systems comes from humans who have a deep understanding of the business and know where to point the tools, how to prepare the data, and how to interpret the results. Creating predictive models requires hard work, and the results are not guaranteed to provide any business value. For example, a model may predict that 75% of potential buyers of a new product are male, but if 75% of your existing customers are male, then this prediction doesn’t help the business. A marketing program targeting male shoppers will not yield any additional value or lift over a more generalized marketing program.

**The Business Value of Predictive Analytics**

**INCREMENTAL IMPROVEMENT.** Although organizations occasionally make multi-million dollar discoveries using predictive analytics, these cases are the exception rather than the rule. Organizations that approach predictive analytics with a “strike-it-rich” mentality will likely become frustrated and give up before reaping any rewards. The reality is that predictive analytics provides incremental improvement to existing business processes, not million-dollar discoveries.

“We achieve success in little percentages,” says a technical lead for a predictive analytics team in a major telecommunications firm. She convinced her company several years ago to begin building predictive models to identify customers who might cancel their wireless phone service. “Our models have contributed to lowering our churn rate, giving us a competitive advantage.”

The company’s churn models expose insights about customer behavior that the business uses to improve marketing or reengineer business processes. For example, salespeople use model output to make special offers to customers at risk of churning, and the managers to change licensing policies that may be affecting churn rates.

**What Is the Business Value of Predictive Analytics to Your Organization?**

<table>
<thead>
<tr>
<th>Level</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very high</td>
<td>27%</td>
</tr>
<tr>
<td>High</td>
<td>39%</td>
</tr>
<tr>
<td>Moderate</td>
<td>27%</td>
</tr>
<tr>
<td>Low</td>
<td>3%</td>
</tr>
<tr>
<td>Very low</td>
<td>1%</td>
</tr>
<tr>
<td>Don’t know</td>
<td>3%</td>
</tr>
</tbody>
</table>

Figure 4. Based on 166 respondents who have implemented predictive analytics.

**How Do You Measure Success?**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meets business goals</td>
<td>57%</td>
</tr>
<tr>
<td>Model accuracy</td>
<td>58%</td>
</tr>
<tr>
<td>ROI</td>
<td>40%</td>
</tr>
<tr>
<td>Lift</td>
<td>35%</td>
</tr>
<tr>
<td>Adoption rate by users</td>
<td>34%</td>
</tr>
<tr>
<td>Profitability</td>
<td>33%</td>
</tr>
<tr>
<td>We don’t calculate</td>
<td>8%</td>
</tr>
</tbody>
</table>

Figure 5. Based on 110 users who have implemented predictive analytics initiatives that offer “very high” or “high” value. Respondents could select multiple choices.
MEASURING VALUE. Our survey reinforces the business value of predictive analytics. Among respondents who have implemented predictive analytics, two-thirds (66%) say it provides “very high” or “high” business value. A quarter (27%) claim it provides moderate value and only 4% admit it provides “low” or “very low” value. (See Figure 4.)

Respondents who selected “very high” or “high” in Figure 4 say they measure the success of their predictive analytics efforts with several criteria, starting with “meets business goals” (mentioned by 57% of respondents). Other success criteria include “model accuracy” (56%), “ROI” (40%), “lift” (35%), and “adoption rate by business users” (34%). (See Figure 5.)

The Process of Predictive Modeling

METHODOLOGIES. Although most experts agree that predictive analytics requires great skill—and some go so far as to suggest that there is an artistic and highly creative side to creating models—most would never venture forth without a clear methodology to guide their work, whether explicit or implicit. In fact, process is so important in the predictive analytics community that in 1996 several industry players created an industry standard methodology called the Cross Industry Standard Process for Data Mining (CRISP-DM).

Regardless of methodology, most processes for creating predictive models incorporate the following steps:

1. PROJECT DEFINITION: Define the business objectives and desired outcomes for the project and translate them into predictive analytic objectives and tasks.
2. EXPLORATION: Analyze source data to determine the most appropriate data and model building approach, and scope the effort.
3. DATA PREPARATION: Select, extract, and transform data upon which to create models.
4. MODEL BUILDING: Create, test, and validate models, and evaluate whether they will meet project metrics and goals.
5. DEPLOYMENT: Apply model results to business decisions or processes. This ranges from sharing insights with business users to embedding models into applications to automate decisions and business processes.
6. MODEL MANAGEMENT: Manage models to improve performance (i.e., accuracy), control access, promote reuse, standardize toolsets, and minimize redundant activities.

Most experts say the data preparation phase of creating predictive models is the most time-consuming part of the process, and our survey data agrees. On average, preparing the data occupies 25% of total project time. However, model creation, testing, and validation (23%) and data exploration (18%) are not far behind in the amount of project time they consume. This suggests that data preparation is no longer the...
obstacle it once was. However, if you combine data exploration and data preparation, then data-oriented tasks occupy 43% of the time spent creating analytic models, reinforcing the notion that data preparation consumes the lion’s share of an analytic modeler’s time. (See Figure 6.)

**Recommendations**

Now that we’ve defined predictive analytics, assessed its business value, and stepped through key trends and processes, it’s important to provide specific recommendations to BI managers and business sponsors about how to implement a predictive analytics practice. This section offers five recommendations that synthesize best practices from various organizations that have implemented predictive analytics.

1. **Hire business-savvy analysts to create models**
   Every interviewee for this report said the key to implementing a successful predictive analytics practice is to hire analytic modelers with deep understanding of the business, its core processes, and the data that drives those processes.

   “Good analysts need strong knowledge of narrow business processes,” says Keith Higdon of Sedgwick CMS. In claims processing, Higdon says good analysts “understand the business of claims handling; the interplay of variables across claim, claimant, and program characteristics; and what data they can and cannot rely on.” Only then, he adds, can analysts create “meaningful models” that result in positive business outcomes.

2. **Nurture a rewarding environment to retain analytic modelers**
   Since good analytic modelers are difficult to find, it’s imperative that managers create a challenging and rewarding environment. Of course, money is requisite. Top-flight analytic modelers often command higher salaries than classic business or data analysts. But good analytic modelers are motivated by things other than money and status, says Tom Breur, principal of XLNT Consulting in the Netherlands.

   “You don’t attract analytic modelers with the same incentives as other people,” he says.

   “They want an opportunity to demonstrate their skills and learn new things, so you have to increase their training budgets. I’ve struggled with human resources departments on this issue.”

3. **Fold predictive analytics into the information management team**
   **THE INSIDE TRACK.** Traditionally, analytics teams are sequestered away in a back room somewhere and report to an ambitious department head (usually sales or marketing) who is seeking to ratchet up sales and get an edge on the competition. Unfortunately, this approach is not optimal, according to most practitioners. Analytic modelers are voracious consumers of data, and must establish strong alliances with the data warehousing team to maintain access to the data.

   “Since I work in the data warehousing department within IT, I go to my colleagues and say, ‘I need this,’ and I usually get it. I get to the head of the queue faster than someone from outside, which means I get more [storage] space, quicker access to data, and more privileges. As a result, my projects get pushed faster. Those are the unwritten rules,” says an analytic modeler.

4. **Leverage the data warehouse to prepare and score the data**
   Once you’ve hired the people and established the organization, the next important task is to provide a comprehensive solution for managing the data that the analytic modelers may want to use. While it is not necessary to build a data warehouse to support the
analytic process, a data warehouse can make the process infinitely easier and faster.

**SAVING TIME.** A data warehouse pulls together all relevant information about one or more domains (e.g., customers, products, suppliers) from multiple operational systems and then integrates and standardizes this information so it can be queried and analyzed. With a data warehouse, analysts only have to query one source instead of multiple sources to get the data they need to build models.

5. **Build awareness and confidence in the technology**

One of the toughest challenges in implementing analytics is convincing the business that this mathematical wizardry actually works. “Building confidence is a big challenge,” says one analytics manager. “It takes awhile before business people become confident enough in the models to apply the results. The ultimate litmus test is when business people are willing to embed models within operational processes and systems. That’s when analytics goes mainstream in an organization.”

But getting to a lights-out analytical environment is not easy. Most organizations, even those with large analytic staffs like Absa Bank, still only apply analytics in pockets and have yet to truly operationalize the results. “Our business is increasingly becoming aware of what’s possible with analytics, but we still battle there,” says Dave Donkin of Absa Bank in South Africa.

**Conclusion**

Applying these five recommendations should enable any organization to implement predictive analytics with a good measure of success. While many people seem intimidated by predictive analytics because of its use of advanced mathematics and statistics, the technology and tools available today make it feasible for most organizations to reap value from predictive analytics.

Wayne W. Eckerson is the director of research and services for TDWI and author of *Performance Dashboards: Measuring, Monitoring, and Managing Your Business* (John Wiley & Sons, 2005). He can be reached at weckerson@tdwi.org.

This article was excerpted from the full, 32-page report by the same name. You can download this and other TDWI Research free of charge at www.tdwi.org/research.

The report was sponsored by MicroStrategy, Inc., OutlookSoft Corporation, SAS, SPSS, Sybase, Inc., and Teradata, a division of NCR.
Why Performance Dashboards?

**CONVERGENCE OF TWO DISCIPLINES.** Dashboards and scorecards represent the convergence of two distinct disciplines in desperate need of each other: performance management and business intelligence. Like long-lost siblings, these two disciplines have struggled on their own to deliver real business value and gain a permanent foothold within organizations. But together they offer an unbeatable combination whose whole is greater than the sum of the parts.

**PERFORMANCE MANAGEMENT.** Performance management is the process of measuring progress toward achieving key goals and objectives in order to optimize individual, group, or organizational performance. Performance management encompasses strategy-setting, goal-setting, planning, budgeting, forecasting, and modeling techniques.

**BUSINESS INTELLIGENCE.** Business intelligence (BI), on the other hand, consists of the tools, technologies, and processes involved in turning data into information and information into knowledge to optimize decision making. BI encompasses data warehousing, data integration, reporting, analysis, and data mining technologies.

Together, these two disciplines provide a powerful new way to communicate strategy to all employees and monitor and analyze business activity designed to optimize performance. The result is a dashboard or scorecard—a new type of performance management system—that uses BI technologies to apply performance management techniques on an enterprise scale.

**THREE MAJOR BENEFITS.** When properly deployed, dashboard and scorecard systems offer three main benefits:

1. **COMMUNICATE STRATEGY.** They provide executives with a powerful means to communicate key strategies and objectives continuously by tailoring metrics to each employee based on his or her role and level in the organization. As an agent of organizational change, dashboards and scorecards enable executives to get the entire organization marching in a coordinated fashion toward the same destination.

2. **MONITOR AND ADJUST THE EXECUTION OF STRATEGY.** Once goals are established, dashboards and scorecards let executives
and managers monitor the execution of the strategy and plans on an hourly, daily, weekly, or monthly basis depending on requirements. These performance management systems enable executives and managers to work proactively and identify and address critical problems undermining progress before it’s too late to fix them.

3. DELIVER INSIGHTS AND INFORMATION TO ALL. Dashboards and scorecards deliver critical information at a glance using graphical symbols, colors, and charts. The applications graphically highlight exception conditions and alerts and let users drill down into more detailed data to find the root cause of a problem. These tools conform to the way users work and don’t force users to conform to the way BI tools work. This is a major reason dashboards and scorecards are so popular today.

What Are Dashboards and Scorecards?
The many different types of dashboards and scorecards can each look and function slightly differently, and often go by different names depending on the organizations implementing them. To dispel the confusion, here is a definition:

Dashboards and scorecards are multilayered performance management systems, built on a business intelligence and data integration infrastructure, that enable organizations to measure, monitor, and manage business activity using both financial and non-financial measures.

Dashboards and scorecards provide more than just a screen populated with fancy performance graphics: they are full-fledged business information systems designed to help organizations achieve strategic objectives. They help measure the past, monitor the present, and forecast the future, allowing an organization to adjust its strategy and tactics in real time to optimize performance.

The Difference Between Dashboards and Scorecards

Some people use the terms dashboard and scorecard interchangeably, while others use the terms to refer to different types of analytic applications for measuring performance. In my definition, dashboards and scorecards are simply different types of visual display mechanisms, within a performance management system, that convey critical performance information at a glance. In other words, they are the monitoring application, not the system itself!

A good performance management system should be able to deliver either a dashboard or scorecard interface, since both do the same thing: display the status and trends of key performance indicators. The primary difference is that dashboards tend to monitor the performance of operational processes, whereas scorecards tend to chart the progress of tactical and strategic goals. Dashboards also tend to display charts and tables with conditional formatting, whereas scorecards use graphical symbols and icons to represent the status and trends of key metrics. (See Figure 1.)

Best Practices in Deploying Dashboards and Scorecards

Much of the advice in this section can be applied to all IT projects, but you will also find targeted tips and techniques for deploying dashboards and scorecards.

1. YOU GET WHAT YOU PAY FOR. You can’t deploy a dashboard or scorecard that delivers real and lasting business value without spending money—unless of course, your company has already invested in a BI and data management infrastructure that can deliver the right information to the right user at the right time in the right format, and has already modeled and loaded a majority of data required in the dashboard or scorecard. Here, companies that
have successfully deployed a data warehouse and BI tools have an edge. Those that haven’t incur greater costs.

One IT manager at a large manufacturing and distribution company garnered significant attention internally when his team created an effective (but decidedly low tech) dashboard for an executive vice president to monitor customer service operations. Soon, other business managers approached the IT manager to convert their Excel and Access databases into dashboards.

“They were decidedly uninterested when we told them how much it would cost,” says the IT manager. “They don’t understand the costs involved in cleaning, integrating, and modeling the data and building a bulletproof system that delivers sufficient right-time and detailed data so that they can make accurate and timely decisions.” The IT manager said it cost $400,000 to build the dashboard and that it’s been running for four years without any dedicated IT support.

Of course, you can deploy an inexpensive performance dashboard today, even without the requisite infrastructure. There are many commercial products that you can license for under $50,000 that provide some data integration capabilities. However, you will eventually need to replace these products as word spreads about the success of your solution and you need to scale it up to support more users, more sources, more detailed data, and more frequent updates without compromising performance and response times.

2. PLAN FOR THE LONG HAUL. Always plan for success, because the alternative is disaster. Word about successful dashboard and scorecard solutions spreads like wildfire. If you’ve delivered a successful solution, you’ll be bombarded with requests to deliver performance management systems for other departments and will need to rapidly expand the scope and scale of the existing system. Meanwhile, the number of users may grow rapidly, placing undue burden on processing power, networks, and databases. If you are not careful, response times will plummet and your hard-won reputation will suffer irreparable damage.

Chris Gentry, director of business intelligence at CCC Information Services, offers this sensible advice based on years of delivering BI solutions: “Unless you prepare for 20 percent growth in users, 15 percent growth in queries, and four to five new data sources every year, you will not meet customer expectations. The initial footprint of your solution should be 15 percent more than your most optimistic forecast.”

3. PLAN FOR REAL TIME. The value of a dashboard or scorecard increases exponentially with the freshness of data. This is not to say that dashboards or scorecards that are updated monthly don’t deliver business value—they can! Many successful Balanced Scorecards, for example, are only updated monthly. However, augmenting a dashboard or scorecard with more timely data increases its value even more. A performance management system populated with more timely data lets executives and managers keep their fingers on the pulse of the organization in ways they never could before. They work much more proactively to optimize performance.

So, even if your business people don’t ask for more than daily updates, be prepared to deliver them. Build in hooks to messaging backbones, if they exist, to trickle feed data into your environment. Or select commercial dashboard solutions that support event-driven processing and can prove their scalability across users, sources, and data volumes.

4. DEVELOP ON A SINGLE PLATFORM. Because “dashboards are in the air” as one BI manager said, it is very easy for managers to build or buy their own solutions independent of each other. The dashboard silos eventually compete with each other for resources and, more importantly, undermine an organization’s ability to get a single picture of what’s going on in the enterprise.

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1 “Real time” is an ambiguous term that means different things to different people. Real time can refer to data that is refreshed instantaneously, every minute, every hour, every day, and so on. For this reason, many people prefer the term “right time” because it emphasizes that data only needs to be as fresh as the business process requires.
This is what happened at IBM several years ago. The company had many different dashboard solutions serving different IBM executives in various departments. Each ran on a different platform, contained overlapping data, and duplicated resources, according to Julia Kennedy, senior manager of enterprise BI and reporting in the CIO’s office of IBM. Eventually, IBM executives selected one dashboard among many to standardize on across the company. The winner, a solution called EDGE (Enabling Decisions for Global Execution), now supports 22,000 users throughout the enterprise.

To avoid the disruption of switching to a new platform, it’s best to develop all dashboards and scorecards on a single platform that leverages a unified data integration infrastructure. The dashboard platform should support team-based development with check in/out and version control with seamless support for the deployment of development, testing, and production environments. The data infrastructure ensures the delivery of trusted business data using data integration, data quality, and metadata management tools. These technologies enable business users to examine the lineage of any data element before making critical decisions. Also, administrators can assess the impact of changes to source systems or applications on data integration workflows and reports.

While it’s possible for a single development team to stay ahead of business requests for new performance management systems in a small company, it’s likely that the organization may need to appoint a program office to manage deployment across multiple departments using parallel development teams. The program office needs to establish standards for usage, data, metrics, and functionality to avoid creating non-integrated silos.

METRICS WON’T PROPEL THE ORGANIZATION IN THE RIGHT DIRECTION UNLESS PEOPLE WHOSE PERFORMANCE IS BEING MEASURED UNDERSTAND, ACCEPT, AND ENDORSE THE METRICS.

5. DEVELOP EFFECTIVE METRICS. Again, metrics are ultimately the key to the success of any dashboard or scorecard. They are the linchpin between the business and technical architectures. There are many techniques for developing effective metrics, but these are the most important ones:

A. GET BUY-IN. Metrics won’t propel the organization in the right direction unless people whose performance is being measured understand, accept, and endorse the metrics. The best way to gain this buy-in is to involve workers in the process of defining metrics, targets, and thresholds. Since workers are closer to the business processes, they will better understand whether metrics accurately capture the nuances of a process and whether targets are realistic or not. When you gather requirements from workers, get their feedback on proposed metrics and targets. You’ll design more accurate metrics that have a greater impact on the business and are less likely to be manipulated by individuals who now have a vested interest in making them work.

B. SIMPLIFY. Humans can only absorb so much information at once. To avoid cluttering a dashboard or scorecard, display only a handful of metrics (four to seven is a good number) on a single screen at a time. If you have more metrics than this—which is not unreasonable if you are measuring an end-to-end business activity—you should create hierarchies of metrics using folders, tabs, or drill downs to preserve the clarity and simplicity of the dashboard display.

C. EMPOWER. What’s the point of displaying metrics if you don’t empower users to affect the outcomes? When designing metrics, you need to examine the context in which they are used and give workers license to make decisions—even unorthodox ones—that will improve performance. This requires reengineering business processes and delegating responsibility to people closest to the customer or the process being measured.
Concomitantly, organizations need to hold workers accountable for the outcome of the measures. If no one is accountable, the metrics won’t have any impact on the organization. It’s also best to hold an individual accountable, even if a team manages the process or task being measured.

D. AVOID PERFECTIONISM. It’s difficult to design new metrics in a vacuum. While it’s important to gather comprehensive requirements and map business processes and information flows, you will never really know how well a metric works in practice until you deploy it and see what happens. To avoid analysis paralysis, adhere to the 80 percent rule: develop the metric to a point where you are 80 percent confident that it will have the desired effect, then deploy it, track the results, and refine it as needed.

E. MONITOR AND REVISE. All metrics have a natural lifecycle. Over time, metrics lose their impact as workers streamline processes to the point where additional gains are not worth the effort. In addition, the business usually changes, forcing organizations to add new metrics that cause workers to expend their energies elsewhere.

To ensure the effectiveness of the metrics and the performance management system as a whole, you need to monitor the usage of the metrics on a continuous basis. Dashboard and scorecard teams should aggressively prune underused metrics (after first consulting with the business, of course), and they should monitor the uptake of newly deployed metrics to quickly identify problems that users may be having with the metrics or views.

F. INCENTIVES. It’s very dangerous to attach incentives in the form of bonuses or compensation to metrics that have not been fully vetted and accepted by the organization. It’s important to deploy metrics for a while in order to identify and close potential loopholes, change calculations to more accurately reflect reality, and provide sufficient training so users understand how to impact outcomes. Attaching incentives to metrics prematurely is a recipe for disaster and can catapult organizations into chaos.

G. INVOLVE TECHNICAL PEOPLE. One common mistake is to create metrics for which no data exists. To avoid this awkward situation, make sure you assign technical people to the team that gathers requirements and designs the metrics. During discussion, these people can evaluate the existence and condition of data needed to populate proposed metrics.

Conclusion
The future of dashboards and scorecards looks bright. Today, many organizations have deployed performance management systems, but the size and scope of a majority of implementations is still small. This will change as user organizations gain more experience with these systems and vendors begin to offer robust commercial dashboard and scorecard solutions.

Growth is bound to happen because dashboards and scorecards provide business users with all the information they need to make effective decisions and achieve strategic objectives without being overwhelmed. These systems deliver data on demand as users need it—from visual displays that let users monitor KPIs at a glance to dimensional and operational data for conducting analysis and taking action.

Wayne W. Eckerson is the director of research and services for TDWI and author of Performance Dashboards: Measuring, Monitoring, and Managing Your Business (John Wiley & Sons, 2005). He can be reached at weckerson@tdwi.org.

This article was excerpted from the full, 24-page report by the same name. You can download this and other TDWI Research free of charge at www.tdwi.org/research.

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Foreword
A common trend among progressive companies is the establishment of one or more centers of excellence. Simply put, a center of excellence (or COE) is a team of people established to promote collaboration and the application of best practices within its area of influence. To be successful, the center of excellence must have a clearly defined charter and the authority to fulfill its responsibilities to the company.

Within the world of business intelligence (BI), companies may establish a single center of excellence, or they may establish separate centers for each of the major BI functions. The number of centers of excellence is not critical; what is critical is that each avoids the mistakes enumerated here. The most significant, critical success factors for the center of excellence include visible executive support that provides the COE with recognized authority; a well-understood purpose and supporting processes; effective, ongoing communications with the business leaders, BI development and support teams, and BI users; and a strong emphasis on leveraging business intelligence capabilities to provide business value.

This Ten Mistakes to Avoid provides information on practices to avoid and practices to emphasize as you deploy a center of excellence within your organization.

1. Failing to Establish Authority and Governance

Failing to provide strong governance and establish clear authority procedures prior to building the center of excellence can render the group rudderless and ineffective. A cross-functional body with executive-level membership is required to create the COE, set and promote its scope, provide funding and other resources, and visibly grant it the authority to carry out its responsibilities. With the governance and authority established, the COE is positioned to efficiently and effectively carry out its mandate, provide templates and other information to promote best practices, and ensure a collaborative environment so that the organization can reap the benefits of reuse and repeatability from a properly planned and positioned COE.

An effective BI program requires resources that often do not contribute directly to the first project. These include the COE, infrastructure components, tools, and technologies. Tool vendors often provide information to justify...
investments in the technological components. The investment in the COE itself, however, must be promoted from within, and the governance body must take measures to provide sufficient funding. The first BI project, in addition to providing the project deliverables, must also support the COE by initiating the creation of reusable best practices. Without adequate funding and recognition of the first BI project’s impact, the COE won’t even get off the ground.

Once established, the COE’s success depends on project teams adopting its best practices. Here again, strong governance is needed to combat the common “not invented here” syndrome. Executives must help steer the culture from one in which teams operate independently to one that recognizes the value of collaboration. Without this collaboration, the COE will be viewed as just a thorn in the side of the project teams.

2. Failing To Define a Clear COE Charter

There are many options for the role of the COE and for determining who within the organization actually builds BI applications. Some very effective COE organizations simply set and document best practices and provide guidance to distributed application teams across the organization. Others provide the described guidance, but are also responsible for ensuring that distributed application teams comply with the documented policies and conduct project reviews and spot audits to ensure compliance is happening. In a third variation, the COE documents best practices, owns some of the development work themselves (possibly for a defined set of data subjects), and provides services to those business units that wish to hire them to do the work on data subjects outside their direct ownership. Finally, the COE can do all BI development work across the organization. Each possible organizational construct is valid and can yield an effective COE. However, given the possible variations, a clear charter and mission for the group is imperative. The charter should explicitly describe what the COE will (and will not) do. If COE services are not mandated, terms and conditions for acquiring these services should be spelled out, including charge-back terms and allocated overhead costs.

If the COE does not have clearly defined and communicated areas of focus, the organization can end up with one of two equally negative possibilities:

- **Turf wars**—with the COE, business units, and other IT groups fighting about who owns data, definitions, standards, quality, funding, and development responsibility.
- **Underlaps**—where critical processes are unintentionally (or worse, intentionally) left out of all parties’ scope of focus.

3. Lack of Business Alignment

The center of excellence supporting business intelligence must always keep in mind the purpose of business intelligence. Business intelligence exists to provide information that can help people understand the past and present so that they can shape the future. While the COE needs to deal with technology issues, it must be careful to approach them based on business requirements. For example, a new tool should not be pursued unless it has the potential of increasing the value of business intelligence to the organization.

The center of excellence deals with business and technical issues. Technical issues (such as data integration or quality challenges) are frequently the most visible, and the COE team must be careful to avoid focusing on these without putting them into context. The business strategies, drivers, and goals provide the context for business intelligence, and the COE needs to understand them. The COE is in a unique position to help the company leverage its information resources to support business priorities. The team must use these priorities to determine the work that it will pursue, the
support that it will provide to the organization, and the information that it will disseminate to help business users best apply business intelligence capabilities.

4. Ignoring the Enterprise’s Culture

To be effective, the COE must be structured to function well within the organization’s existing culture. While it is possible to change an organization’s customs through effective change management (strong leadership, proper training and communication, targeted metrics), it is difficult to effect any change that is not in keeping with the basic culture of the company. Existing levels of cooperation between business units, relationships between IT and the business (for example, does the business often do an end-run around IT?), historic technology funding and cost allocation methods (cost-center or charge-back), and the strength of the governance committee must all be taken into consideration.

If your organization is one where business buy-in is high, cooperation is good, and resources are scarce, you might want to start with a model where the COE provides training, templates, guidance, and deliverable reviews, but the actual project work is done locally. On the other hand, if you can’t ensure cooperation across units, you might focus on developing strong governance to secure authority for the program while also building a central COE that takes responsibility for doing the work as well as developing the templates and best practices.

5. Unclear Roles and Responsibilities

The COE concept is relatively new, and the roles and responsibilities for it may not be understood at first. This can easily lead to confusion and potential conflicts with other corporate functions. It is easy to create a mission and objectives for the COE, define its processes and procedures, and determine its reporting structure, yet neglect to clearly establish the roles and responsibilities of the personnel assigned to the function. This mistake creates the potential for redundant roles, gaps in activities, and frustrated personnel. Worse, it may be perceived that the COE is inefficient, chaotic, and not living up to its billing.

To avoid such a bad first impression, each role and its corresponding responsibility should be clearly defined and carefully mapped to a set of activities, procedures, and processes. All members of the COE must understand where their job starts and ends, and the person placed in each role must have the required experience and knowledge, or be provided with education to address deficiencies. This mapping will identify any gaps in responsibilities. These gaps must be filled, either by developing new roles or by expanding a role’s responsibilities.

6. Inappropriate Staffing Skills and Resources

Demand for the work products of a center of excellence is high in most enterprises. If the COE is understaffed or staffed with inexperienced, untrained resources, the business will rapidly become frustrated with the lack of progress and the COE will become viewed as an obstacle to be avoided.

We recommend that a COE start with a small staff of highly knowledgeable experts in the areas of data integration and BI. If the company has completed successful BI projects, people from those projects may be selected for the initial COE staff. If these are not available, the company may temporarily engage seasoned BI consultants to fill these roles at first.

As the success of the COE grows and the number of projects increases, the COE must be able to staff to the new levels of demand. Each role previously filled by a consultant needs to
be filled by an internal resource. Knowledge transfer is critical to making the shift to the internal staff.

In addition, these resources must constantly keep up with new technological capabilities, design techniques, or other BI breakthroughs. Funding must be available for training, attending conferences, visiting vendors, and other means of updating the skills of the COE staff.

7. Inadequate Communications

A problem that has always plagued both data warehousing and business intelligence is that they are often viewed as very expensive programs. It is not enough for the center of excellence to merely integrate data and develop a business analytics environment. To fully leverage information for corporate value, the COE must communicate with the organization in various ways. One way is to interact regularly with the business and technical community. Through these interactions, the COE team members will become more aware of satisfaction levels, strengths and weaknesses of the existing environment, and benefits that are being received. In addition, the COE may learn of unique uses of information, so that it is in a position to inform others of opportunities to further leverage information in the BI environment.

The COE should pursue other forms of communication as well. These include newsletters with information about internal activities as well as activities elsewhere, and developer or user forums where people can exchange ideas and techniques.

8. Failing to Publicize and Promote Best Practices and Procedures

A primary role of the COE is to define and document best practices, templates, training programs, communication programs, and standards. Unfortunately, this takes time, particularly the “defining” part. The more people who are involved, the more potential there is for differing standards, lack of documentation, conflicting definitions, and overlapping (or worse, underlapping) processes. This is particularly true when the list of projects is long, resources are scarce, and potential for bottlenecks is high. Thus, it is imperative to establish the discipline for processes and documentation early to ensure that new innovations, tools, and technologies follow existing standards. This will allow the COE to expand mentoring activities; it will also reduce training times and allow resources to become productive faster. Processes and documents that should be established up front (and refined as necessary) include data acquisition and metadata, business requirements–gathering templates, change management processes, training programs, and so on.

In addition, skilled data warehouse resources are in short supply in today’s market, and high demand for COE services, along with internal resource constraints, has the potential to cause the COE to become a bottleneck. A popular workaround for this common problem is to contract external resources in times of high demand. Best practices documentation is an effective and efficient way to ensure external resources are performing to the same standards as the rest of the COE.
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9. Lack of Technology Control

A problem that often plagues a company building a COE is that each set of business users selects and acquires tools to meet its needs. We often hear from companies that “we have one of everything,” and often, they don’t even know exactly what they have. While having multiple tools is often advisable, having too many tools can be detrimental to a company. Lack of tool standards limits portability of applications and people, requires additional training courses, limits collaboration among groups, increases software licensing costs, and often requires redundant data marts and other data sets.

The center of excellence must get a handle on the technology within its scope of responsibility. As a starting point, it should develop an inventory of installed tools, possibly with assistance from purchasing. Once the inventory is established, the center of excellence should review tool use, determine if there are opportunities to reduce the number of tools, and initiate actions, in conjunction with business users, to arrive at the standard tool set. Once this is achieved, the center of excellence should become the focal point for interacting with the vendors and should acquire the skills required to provide the needed support and education within the enterprise.

usually this means doing an end-run around the COE and creating a silo or shadow BI application. While it may be a short-term fix to the emergency, this is not good for anyone in the long run.

The COE must have a process in place to accommodate emergency requests. The process should include a recognized approach for evaluating the emergency so that the emergency request is pursued or rejected with the backing of the governance body. To pursue the emergency, the COE may have to shortcut its own processes and procedures to avoid an end-run. A stopgap procedure should be developed that streamlines or goes around the normal procedure, perhaps even leading to a standalone application. The key to success in this situation is to ensure that, if a shortcut is taken, the appropriate long-term solution is pursued once the emergency has been handled. Once that solution is in place, the shortcut should be removed and no longer used.

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10. No Emergency or Appeal Process

For most business requests, the center of excellence will follow its documented procedures and processes. However, situations will arise when the business must have a data set, report, analytic result, or application created unexpectedly. If the COE refuses to consider the request or deal with the emergency, then the business will find another way to solve its problem.
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Open source software (OSS) is being adopted by an increasing number of IT organizations for business intelligence and data warehousing. Some organizations are using open source operating systems to take advantage of inexpensive commodity hardware; some are using open source databases to reduce license costs and increase query performance.

Early adopters are using open source reporting tools to build operational reporting into transaction applications and Web sites, construct data mining applications, and provide integrated BI and geographic information systems (GIS) features to end users. Commercial BI vendors are increasingly supporting open source platforms as well as incorporating open source software directly into their products.
IT organizations are looking for one of three things when they consider open source software: cheaper software, more functional software, or software features that are unavailable elsewhere. OSS projects offer something in all three areas.

The majority of companies (70 percent, according to a CIO Insight survey) report that cost was one of the initial drivers that made them explore open source. Most other companies looked to OSS for software or features that were unavailable elsewhere. For these reasons and more, OSS is an increasingly viable alternative to commercial software in the BI/DW market, and its impacts are being felt by both customers and vendors.

**Vendors and OSS**

One positive impact open source software has for commercial BI/DW product vendors is that it can reduce the total cost of a BI/DW implementation. Running commodity servers with an open source operating system or database removes a significant portion of the total platform costs for a data warehouse. This reduction in total project costs makes a BI project easier to justify and fund.

Vendors can also benefit by replacing product components with open source alternatives. For example, many BI vendors now use the free Tomcat or JBoss application servers. Business Objects takes this a step further by allowing you to use the MySQL database for the metadata store as well as the data warehouse. When parts of their products are built using open source components, the vendors’ maintenance costs are lowered, allowing them to reduce prices.

On the other hand, this benefit can also become a drawback: The availability of OSS alternatives, even if they are not equivalent in features or scalability, is beginning to put pressure on commercial BI vendors to lower their prices. While most open source BI projects are not equivalent to their commercial counterparts, they are good enough in some areas to pose a challenge to vendors. Early adopters are already using OSS BI tools in place of commercial offerings. And the consolidation trend in the BI market is helping to spur OSS adoption; there are fewer single-product choices, and the big BI suites can cost a small fortune.

One of the advantages of OSS is that the software can have a faster rate of incremental improvement than commercial software. Vendors are driven to provide new features that customers want, but often give priority to those features that will differentiate them in their marketing efforts. This means that many good features may not be added because they are either easy for other vendors to copy (non-differentiating) or are not viewed as profitable relative to other features.

Vendors often choose to add functionality rather than improve usability or existing features. Small improvements in existing functions offer no differentiation, while adding new features does. Over time, however, this approach leads to software that is bloated, inefficient, and difficult to maintain.

Open source allows incremental features to be fixed by whoever is most pained by them, while others focus on new additions. Over time, the most used features improve, and the most desirable features are added. Thus, OSS is not driven by marketing needs in the same way as commercial software.

**IT and OSS**

A side effect of the open source development model is that third parties have some of the same resources and tools available as the creators of the software. This increases support options, since multiple parties can provide services, whereas only the vendor can provide support for a commercial model. As OSS adoption progresses, the community using the software can become self-supporting, as well as use third parties.

One of the big complaints many IT departments have with software companies is vendor-imposed upgrade cycles. Vendors that terminate an older
version of a product can create a major headache for customers who are forced to upgrade. In a data warehouse context, an upgrade can be challenging because there are usually multiple products from different vendors with different sets of dependencies. Changing one product may mean changing several at once. But with open source, the upgrade cycle is on your time frame, not a vendor’s.

Open source usage is often represented as an all-or-nothing proposition, but data warehousing is a broad range of technologies—not a single technology. Hence, the adoption of OSS for BI/DW can be uneven depending on the maturity of the OSS technology in question. Most successful efforts involve both open source and commercial software.

Operational BI and embedded reporting is a perfect example. Most BI tools are notoriously difficult to integrate into other systems, and provide many features that aren’t needed in an operational setting. They are also very costly, since they are usually priced on a per-user basis. This makes operational BI an expensive alternative when you have hundreds or thousands of users for an OLTP application.

OSS projects focused on interactive reporting are less mature than most commercial alternatives. However, the opposite is true for embedded reporting. Organizations are having great success using OSS BI for embedded reporting, because the software is built using easy-to-integrate technologies, there is no license cost, and it’s easy to customize the software to a given situation. At the same time, these companies are keeping their commercial BI tools for interactive reporting and analysis. Operational BI is one of the areas where the strengths of OSS BI tools and the weaknesses of commercial BI tools meet.

The modular architecture of data warehouses makes it easy to mix OSS with commercial offerings, filling the gaps where your current BI software can’t provide what you need. For almost every data warehouse component, there is an open source project—from databases and ETL tools to advanced visualization. In some cases, like portals, statistics, and GIS software, OSS rivals the commercial alternatives.

This easy availability offers an inexpensive way to explore other areas of BI. You can do a small-scale implementation without worrying about trial licenses or signing vendor NDAs. If the test is successful, there are no licensing costs tied to a larger deployment. This ability to easily test different approaches to solving BI-related business problems is one of the biggest impacts OSS can have on the IT organization.

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Collaborative Reporting Architecture

Actuate introduces the Collaborative Reporting Architecture which harnesses the power of the Eclipse Business Intelligence Reporting Tool (BIRT) Open Source project while offering significant new deployment opportunities to customers.

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The Collaborative Reporting Architecture opens new markets and projects by appealing to the industry’s largest technology audiences: Java application developers, IT, report developers, power and business users, and end users of all skills. This breakthrough new architecture offers skill-specific environments for each role listed above while it facilitates design sharing between these roles and interactivity within each report. The result is a breadth of reporting applications, born from a thriving community of Open Source developers that reaches throughout the enterprise.
BI Pricing: A Buyer’s Nightmare

BY CINDI HOWSON

I had a nightmare last night:
My family was out buying a car. I liked the Mercedes-Benz Roadster, convertible, in burgundy. The rest of the family wanted the Hummer H2. We did our best to compare miles per gallon, space, handling, and other obvious features. I knew we should have started with price, but there were no stickers on any of the windshields. The dealer wouldn’t give us any indication whether these cars were in our budget until we had already driven them, picked the color, picked the interior, selected a navigation system, and so on. Finally, we got two quotes.

The Mercedes seemed to be within our budget, while the Hummer looked too pricey. But in reading the fine print, we learned that the Mercedes didn’t include something we had thought was standard: a gas gauge. Another surprise: the 6.6L 300hp engine on the Hummer would cost us double the 6.0L 325hp engine. (What do I know about horsepower? I just need to drive the thing.)

We were about to buy the Mercedes, with the gas gauge option, when the salesperson asked if we wanted the extended warranty. If we got it, they would help us no matter what; if we didn’t, we would have to log any requests on a Web site (possibly while stranded on the roadside). I hadn’t considered any of this, but felt pressured to sign. It was a year-end closeout and the offered discount would expire tomorrow. Further, this sales rep was changing jobs, and who knew who would be here tomorrow...
I woke up in a sweat, to my $20,000 minivan.

As a BI buyer, you would think that when you ask a vendor to provide a quote based on your requirements, you could readily compare it to a quote from another vendor. You can’t! When you do, chances are you are not comparing like-for-like capabilities. In an effort to win a deal, a vendor may offer you a lower-priced option than what you really need (and than what they demonstrated). Unfortunately, you will realize only during implementation that you have not licensed all the modules your company really needs. While the vendor may hope to up-sell you after winning the initial deal, you are now in the embarrassing (if not impossible) position of having to request more funding or foregoing beneficial products.

While several leading BI vendors have introduced integrated suites in recent months, this has also led to a change in pricing and packaging. Most pricing models are so complex that confusion abounds. Whether you are planning an upgrade or buying new, plan to spend an inordinate amount of time not just on evaluating new features and functionality, but also on understanding pricing and packaging.

In this article, I’ll highlight a few of the key ways that BI vendors differ in their pricing policies.

**Server-based Licensing**

Server-based pricing allows a company to buy a license regardless of the number of potential users on any given server. Server-based pricing can be ideal in larger deployments when the expected number of named users is unknown. When the number of users on any one server threatens performance, a customer can buy an additional server license and distribute the load. The definition of a “server” varies, though, with some charging for number of CPUs and some (more recently) per core.

Many vendors have different pricing policies for different server platforms such as Windows, Unix, and Linux, and even more differences for 32-bit or 64-bit operating systems. Some, however, keep it simple: it’s one price regardless of the operating system.

**User-based Pricing**

BI vendors may charge a user fee in addition to, or instead of, server-based pricing. A user could be a named user or (seldom) a concurrent user. Named user pricing is often preferable to server-based pricing for smaller deployments or when any given user may access multiple applications deployed across multiple servers (for example, a financial application and customer orders, both of which use the same BI tool). Named user licensing is also important for a minority of users who will have expanded capabilities. For example, companies may want to buy a named user license for 10 report authors, but will buy a server-based license for 1,000 report consumers. Be careful here too, though: some vendors do not allow you to mix and match server-based pricing for some components and named user pricing for others.

**User Roles**

As BI vendors have expanded their solutions, a named user will also often need an associated role and/or bundle. The role defines what software modules or tasks a user can perform. For example, with Cognos 8, a “report consumer” can access prebuilt reports and refresh them, but cannot create new reports, while a “business author” can. Hyperion and MicroStrategy also have roles associated with their platforms.

**Product Bundles**

Bundles refer to the grouping of multiple software modules and capabilities (think Microsoft Office Professional or Microsoft Office Standard). These bundles can apply to server-based pricing or to roles. For example, with BusinessObjects Enterprise Professional, the platform includes one content type and excludes capabilities such as auditing. BusinessObjects Enterprise Premium, meanwhile, includes multiple BI content types as well as server-based modules such as Auditing, Live Office, and Encyclopedia.

**Individual Products**

Just as you can still buy Excel as a standalone product (rather than via a bundled edition), so too you can sometimes buy individual pieces of a BI suite. However, it can be tricky to determine what is considered a product versus infrastructure. Product components may range
from end user pieces such as query, pixel-perfect reporting, OLAP, visualization, dashboards, scorecards, portal, usage monitoring, and business event notification, to administrative tools such as usage monitoring, scheduling, report bursting, and connectivity to individual data sources. Customers who have in the past felt nickel-and-dimed by too many a la carte pricing options seem to prefer these bundles and/or roles. Further, as the integration within BI suites improves, it is sometimes less apparent when you are using a different module or product that may require an additional product license (and yes, just as the gas gauge was an option in my nightmare, so too BI usage monitoring is an option in several BI suites). A la carte pricing is often more expensive than bundles, and in some cases, vendors no longer offer it.

**Test/Development/Production**

Vendor approaches to development licenses range from no charge to full price, which frankly, I find ridiculous for end customers. It’s clear to me that independent software vendors should pay full price for developing software on a BI platform, but for end customers looking to safely test software upgrades or new applications without affecting a production environment, it’s absurd. If you have a named-user license, this licensing aspect may have less relevance (assuming the vendor doesn’t restrict the named user to each server installation).

**Maintenance and Support**

When buying software, you are paying for current functionality. Maintenance generally includes bug fixes, software upgrades, and varying levels of support. Maintenance fees are often a percentage of your total license agreement, ranging from 18 to 30 percent of either the list price or discounted price. With your maintenance, you are typically entitled to phone or Web support and software upgrades. But here is the gotcha: a new version may not be an upgrade, but rather an altogether new product. Hence, Hyperion charges existing customers an “entitlement fee” to move onto the System 9 platform. Cognos ReportNet (now part of Cognos 8 in varying roles) is not considered an upgrade for Impromptu users; it’s a new license, although the ability to trade in existing licenses is negotiable.

**From Nightmare to Reality**

BI pricing is a problem for customers and vendors alike. Vendors need to extract additional fees when customers require additional value. Customers don’t want to pay for shelfware. Sticker shock is never a good thing, yet BI buyers need to know about all the possible modules, since they cannot keep asking project sponsors for more funding. It’s reasonable for customers to know what a BI license will cost them. To minimize the pain in this process:

- Manage expectations with all stakeholders early on (including the project sponsor and vendor) as to your buying strategy. Will you buy incrementally, or strive for a one-time purchase?

- Plan an adequate amount of time (days and weeks, not hours) to decipher each vendor’s pricing and packaging strategies.

- Ask to see the vendor’s full price list (don’t expect all to comply).

- Enlist the help of a third-party consultant (not involved in reselling the software) to help you identify differences in quoted configurations.

Pricing should be transparent enough that a customer can easily compare quotes from multiple vendors. Even ERP and database vendors publish their price lists in order to provide this transparency. In reality, BI pricing is in many ways a guessing game, one that demands a high amount of education and is fraught with surprises. In short, it can be a nightmare.

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Abstract
The right information makes it easier to make the right decisions, yet corporate information is sorely under-utilized today. In a recent market survey, TDWI found that an average of 18 percent of potential BI users actively use BI tools today. Why is the reach of BI across organizations so low? Is it that IT has limited resources for broad BI deployment, or is the limitation on the business side, where users just cannot easily adopt what is provided?

Both answers are correct. The bottom line is that complexity limits IT and complexity limits user accessibility.

We illustrate four key strategies to drive broader user adoption while minimizing IT complexity. Understanding these strategies provides a foundation from which to gauge the reach of an existing BI deployment and consider new initiatives to drive broader information use across an organization. This foundation creates favorable circumstances for IT, and the business gains greater leverage of their information.

Introduction
Many organizations have invested significant time and money implementing reporting and analysis projects to deliver business information. However, these projects are not achieving the anticipated broad user adoption across every level of the organization. Indeed, in a recent market survey, TDWI found that an average of 18 percent of potential BI users actively use business intelligence (BI) tools today. (Eckerson, 2005)

What prevents broader user adoption of BI in the enterprise today when, even at home, modern Web technology provides unimaginable access to information and tasks to research vacations, manage bank accounts, and select entertainment? One thing is clear: IT must bring the level of simple accessibility experienced at home to the world of enterprise data and put the right information in more people’s hands. This requires inventing new ways to engage users with information when, where, and how (in what format) they need it.

The good news is that BI vendors have started to recognize this shift to user accessibility and offer organizations a better path that is also cost-effective for IT.

Barriers to Information Accessibility
When I talk to organizations about the business challenge of leveraging information more broadly across every level in their organization, common concerns consistently emerge, typified by four simple questions:

• Why are the tools so hard to use?
offset ease of use. So, although each tool in isolation provides value, the trouble with this approach is that multiple tools result in multiple user interfaces to learn, multiple views of data, and (most critically) different information despite sharing of sources.

What if users were offered just the capabilities they needed for their jobs? What if users could start with just what they needed and graduate to more sophisticated capabilities as they became familiar with the data and comfortable with the tools? What if this role-based, task-oriented approach
enabled each person to work from a single data foundation and common user experience so they could collaborate with each other on reports and analysis just as they wish to collaborate when it comes to decision time?

Task orientation first defines each user in a role that reflects his or her level of required interaction with a set of information to perform a job. These roles fall along a spectrum from simple viewing to full-blown formatted report production. For example, a viewer or recipient simply receives pre-formatted reports or e-mail messages; a production operations manager receives daily reports of quality across manufacturing lines; a salesperson receives e-mail updates of sales-to-date versus quota.

One step along the task-oriented spectrum would provide a consumer role with a greater level of interaction and data-driven navigation and drill-down into available analyses. For example, a regional sales manager could access all sales information to slice and dice by sales rep, customer, product, and territory. In a more expert business author role, a business manager may want all the capabilities of the viewer and consumer, plus the ability to build, save, and distribute queries and simple analyses to others. The analyst role requires the most sophisticated analytical capability to research, reshape, and synthesize information and then share the interesting findings with consumers. For the most sophisticated production-report formatting, a professional author role has the flexibility to define and distribute highly formatted, multi-query complex reporting. In addition, a single user could have multiple roles: a financial manager may assume a viewer role for revenue, a consumer role for HR data, and an analyst role for financial information.

The key to success for task orientation is to start simple and let the users demand more by providing a simple path to increasingly sophisticated business intelligence. In this way, the ratios among authors, consumers, analysts, and managers change dynamically over time—some users remain content where they are; others become analysts or authors, and new viewers and consumers constantly join. This dynamism requires that the full range of capabilities be provided in a common user paradigm so the learning curve is evolutionary. However, a smooth user experience alone is not sufficient. The data that drives each capability must also be widely available to ensure the same data is represented in both a managed report and a dashboard or in a cross-tab analysis, so that users have a common basis for decision making regardless of role.

For IT, a single-user paradigm and common data access reduce user re-training, support calls, report backlogs, and data inconsistencies across tools.

Rather than defining users solely by the data they access and the reports they request, approach the situation from a third dimension—categorizing users’ roles for task-oriented sophistication.

Deliver Business Information with Familiar Tools

It would be unusual to find a businessperson unfamiliar with Microsoft Office applications such as Word, PowerPoint, and Excel. The challenge with using these tools for information delivery is that each person can create a unique version of data. As a result, workers spend more time in meetings reconciling the numbers than discussing the business meaning of the numbers. In addition, businesses often spend more time and effort to create a particular view of the data than they spend on the analysis and decisions.

Historically, Excel has been popular because users find it too difficult to create the views they need using the BI tools that deliver the original data. Indeed, many of these traditional BI tools only exacerbated the problem by providing the ability to export the data to Excel. As a result, BI became the data extraction layer and users massaged the data in Excel.

What if users who are familiar with Excel, PowerPoint, and Word could stay within these familiar tools and use the BI information as their source, thus retaining connection to the sanctioned data for consistency? What if live links kept changed data updated in the end user’s spreadsheets and documents? What if this could happen without hindering a user’s ability to create the desired view of information?

The solution is not to export data out of BI to these productivity tools as a destination, but to bring the productivity tools into the BI fold by reusing them as an alternative user interface to BI.
The key to success is to start users in their Office tool of choice, where they are most comfortable, and integrate these applications with BI technology. BI vendors that interoperate with Office can enable BI-driven selection lists, tables, and graphs, and they offer customized layout and formatting within Office. IT should train the users to think of Office tools as an alternative user interface instead of a data dumping ground, and reinforce the value of keeping the data refreshed and accurate so energy can be focused away from data gathering and into data analysis.

Accessibility here means providing business users with the information they need using the tools they are familiar with, while maintaining the link to corporate-sanctioned information. This approach balances the need for information delivery with the need for information control. The value to IT is greater leverage of corporate data assets, reduction in data fragmentation across the user community, and broader adoption of BI information.

Rather than making it easy for users to exit the BI world as quickly as possible into their personal productivity universes, IT must embrace users’ desire to work with their everyday business tools and bring those tools into the BI world.

**Use Search Tools to Find Information Even If a Report Doesn’t Yet Exist**

When you are looking to purchase a specific flat screen TV, do you first find out what stores stock TVs, make a list of stores in your area, and visit each in turn to find availability and pricing? Probably not—your first step is search for information on the Internet. Why, then, should a businessperson looking for “Sales in the East Region” be expected to learn which system holds the data, recall how to navigate to the particular report, and remember how to open and read the report?

As information access is required more broadly across the organization, and as more data comes online for BI to access, the traditional navigation tools of folders and reports that used to be adequate are now un-navigable to the occasional consumer user.

Historically, as report libraries grew, traditional BI vendors focused on better managing the report library, providing folders, personal favorites, and simple title text search. These approaches are still valid, but their basic premise is that users are looking for reports that already exist. The result is that users are often frustrated in their search and end up creating their own new report, adding unnecessarily to report overload.

What if users could enter text strings just like they can in an Internet search tool such as Google? What if that search looked beyond the simple report title text, into the metadata of reports? Better yet, what if it could examine the metadata in the BI model to retrieve data and create a new report? Imagine the value of these structured search results if they could be displayed in order of relevance, together with unstructured results of related documents, to provide a rich context regardless of data location. Even more impressive would be a search that resulted in an information summary.

The answer, therefore, is to bring Internet-like search capabilities to the structured data world so any business user, from the consumer to the high-end analyst, and even those who have never used

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**CHECKLIST**

- Users can collaborate on report development without IT involvement
- Presentation tier can integrate with industry standard portals (SAP, IBM, Plumtree, and WSRP portlet standard)
- Base reports are multi-lingual, reducing report proliferation
- Link available to PowerPoint and Excel to avoid data replication
- Data shared rather than duplicated across geographically dispersed teams
- Accessible in enterprise search along with unstructured information
- Pushed to users via e-mail and wireless devices when significant conditions occur
- BI capabilities are available 24x7 for mission-critical business uses
BI, can enter “East Region Sales” and discover relevant reports. In addition, this BI search could be tied to Google, IBM, FAST, Autonomy, and others to link unstructured data (such as sales reports and sales presentations) to structured data to offer the most complete picture possible in a paradigm users already understand.

Behind the scenes, search capabilities leverage the business metadata model to index the information within the BI world and provide business terms so the search can deliver consistent results. To do this, the BI information must be confined to a single metadata model to allow the search to correctly interpret the data and prevent conflicting results. This BI search capability must obey security access rules to provide only permitted information. In addition, it must seek existing reports as well as the metadata of all available BI information and, if necessary, generate the report (even if it never existed before).

Applying Google-like search simplicity to BI opens up data accessibility to everyone in the organization in a cost-effective manner. For IT, search technology offers a simple interface to users not typically enabled with BI tools, and extends the reach and value of information. More importantly, effective search reduces report proliferation generated simply because the user gave up trying to find an existing report. This means less report maintenance, fewer requests for additional reports, and greater user empowerment.

Augment traditional folder and report-list navigation with search tools to transform people from report finders to information seekers who need not know where information is stored or what report must be opened. Using search to find business intelligence information opens up the world of structured data to everyone in the business.

**Let the Significant Information Find the Right Businessperson**

Using role-based BI and information search assumes the businessperson knows to look for information. Imagine, however, that information found the businessperson by identifying significant numbers and knowing who cares about it in the organization. In a typical reporting scenario, a 60-page report arrives at each line manager’s desk every month. Each manager searches through the entire report to find that (in most months, at least) everything is running smoothly. The manager suffers from report overload, stops reviewing the report, and misses something significant.
In the past, IT looked to tackle this information overload by deploying alerts. For example, when sales are off target by five percent or more, an e-mail automatically alerted the sales manager. This was the right idea, but the growth of alerting simply resulted in a crowded inbox and only frustrated the business until the alerts were turned off.

What if users were informed only when significant conditions occurred, and only when they needed to know (based on whether the event is new, ongoing, completed, or never occurred)? What if different users could be informed at different times, or unresolved events escalated to management? What if these different users at different times received the information in the vehicle that suited their role, e.g., e-mail or portal news headline?

The good news is that like search, exception-based (or event-driven as it is now called) BI has advanced well beyond this crude alerting approach. Business intelligence vendors have built sophisticated handling to monitor significant information conditions (or events) over time and provide different action paths for new and ongoing events while eliminating unnecessary e-mail. Most importantly, this approach enables escalation and informs the business when an issue has been resolved.

The key to success is to identify three to five key business conditions for which faster time-to-resolution would provide significant value, then identify the people who need to be informed of the business condition. Determine at what point each person needs to be involved, and what information delivery vehicle is best suited to that person’s role.

For example, a condition might be a high-value customer who is late in paying invoices because of unresolved returns of damaged products. If the returns problem could be addressed, then finance could pursue payment and lower the number of “days sales outstanding.” In this case, the fulfillment team needs to know immediately about damaged returns from high-value customers and have ad hoc access to all the information to resolve the issue. The sales rep needs to be informed of the situation by e-mail, whereas the fulfillment manager only needs a news headline if the issue is not resolved. Once the returns are resolved, finance must be informed so it can secure payment. Finally, all involved parties need to be informed when all issues with the customer are resolved.

This information-to-action path puts the right information in the right businessperson’s hands at the right time using e-mail, dashboard headlines, and other delivery mechanisms. Rather than relying on users to find significant data for action, event-driven BI brings the significant data to their attention. In this way, the business can proactively focus on what matters most.

Making Information Part of Everyday Business Life

By molding business intelligence to each user’s needs, enabling information searches that are as easy as searching the Internet, delivering data to familiar everyday tools, and delivering only significant information to the right person at the right time, enterprises can extend the promise of BI to every person in the organization. Now that BI vendors have delivered these capabilities (or are planning to), BI will no longer be a tool for the few, but a necessary and accessible part of everyday business life for everyone. As a result, companies will be able to better leverage their information by having a focus on the business issues and decisions at hand, and do drive improved business performance.

Whether revisiting your user community to refine roles, shifting Office applications from a destination to a user interface, incorporating search, or selecting and implementing event-driven BI, assess your BI deployments and explore how you can gain broader user adoption by delivering BI in new ways.

Reference


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Putting the Business Back into BI

Although BI means “business intelligence,” it sometimes seems that the technology interests supersede those of the business. If your BI program gives more attention to dashboards, scorecards, OLAP, and data warehouses than to finance, R&D, marketing, operations, and customer support, then you likely need to put the business back into BI.

The sole purpose of business intelligence is to deliver information that makes a difference—substantial, bottom-line business impact that is achieved through increased revenue, reduced expense, and risks avoided. The challenge of BI lies in making the connection between these business goals and the information that is actually delivered. All too often, BI delivers the metrics that are available, obvious, and easy, and misses opportunities to deliver truly high-impact information.

Managing big-picture BI is a challenge that demands clear relationships between business impact and information services. This article proposes a framework to meet that challenge by intersecting concepts of business management, business measurement, and corporate governance. At a macro level, the framework looks at BI program management as a multi-dimensional discipline, as illustrated in Figure 1.

The Business Management Dimension
Business intelligence is, first and foremost, about business. Yet all too frequently the basics of
business don’t have a place in the overall structure of BI program management. Virtually every business has processes, functions, and organizations with responsibility for each of eight business management disciplines:

- **Strategy and planning**, including business mission and goals, business strategy to achieve the goals, and the business processes, functions, and plans that carry out day-to-day actions to meet those goals. A high-value BI program must connect with business strategy and support planning processes.

- **Financial management** with all of its many sub-functions—budgeting, cash management, credit and debt, revenue and expense, fixed assets, general ledger accounting, and more—is central to every business. Financial metrics are common in BI applications. Strong connection of financial measures with other business measures is more difficult, but a core element of real intelligence.

- **Research and development** is crucial to the long-term viability of commercial enterprises. In a rapidly changing, technology-driven consumer marketplace, continuous market and technology research are essential to managing a competitive pipeline of new and exciting offerings to customers. R&D intelligence is a key component of a well-rounded BI program.

- **Marketing** defines the market position of a company, its products, and its services. Knowledge of market segmentation, pricing, distribution channels, customer relationships, and campaign effectiveness are all significant factors of competitive positioning, and they are all information-dependent processes that benefit from BI solutions.

- **Sales, customer support, operations, and human resource management** round out the eight dimensions of business management with the disciplines, processes, and functions that translate strategy and positioning into actions and business results. Each of these benefits from informed management, and each is a supplier of feedback data into a comprehensive BI system.

**The Corporate Governance Dimension**

The most effective BI solutions are corporate systems that integrate across the organizational, functional, and data boundaries of the enterprise. As with any enterprise-wide resource, coordination is best achieved, and value is maximized, through governance. Seven elements of corporate governance have a role in big-picture BI:

- **Business organization** defines the structure of business units, relationships among those units, and responsibility and accountability structures. Successful BI has cultural impacts that change the nature of responsibility and accountability, and frequently drive organizational change.

- **Business ethics** regulate the behavioral culture of an organization. Increased availability of information through BI systems brings new considerations about privacy, security, and policies governing appropriate use of information.

- **Legal counsel** is the counterpart to ethics—ethics provides a regulatory framework, but legal counsel provides enforcement and remedy structures.

- **Business policies and procedures** are inevitably affected by BI. As metrics and measures impact organizations and decision processes, policies and procedures must change to keep pace.

- **Compliance, risk management, and audits** complete the seven elements of corporate governance. Each is information-dependent, readily enabled through intelligence, and essential to sustained corporate success.

**The Business Measurement Dimension**

BI delivers business measures, which are the essence of dashboards and scorecards. But measures alone don’t assure success or value. This truth is effectively illustrated in a statement that I heard from Aaron Walz, business architect at the University of Illinois: “You can’t make a pig fat by weighing it.” This short quote makes two important points: Measures aren’t useful unless they are actionable; and they aren’t valuable unless they are acted upon. Moving from measures to value demands attention to six principles of business measurement:
• **Data** is the raw material from which information is created. Every business measure is a data point from which higher-level measures and metrics are constructed. You can measure only where data is available and where measurement systems can be put into place.

• **Information** is data in context. Measures alone have little meaning for decision-making processes. When translating measures (data) into metrics (information), be clear about the level of detail and the benchmark or threshold criteria against which the metric is evaluated for decision purposes.

• **Knowledge** is a human thing that is unique to organizations and to individuals. Consider those to whom information is delivered, and how best to align information with knowledge in ways that enable informed decisions and drive continuous knowledge growth.

• **Actions, outcomes, and value** complete the six principles of business measurement. *Action* means doing something. Weighing the pig suggests that a change of diet may be needed, but it is actually changing the pig’s diet that might make it fat. *Outcomes* are the results of action. When the pig gets fat, a desired outcome has been achieved. As well as providing input to decision processes, measures help to evaluate the effectiveness of the decisions made. *Value* is derived through the achievement of desired outcomes, completing the data-to-value chain.

**Putting the Pieces Together**

Intersecting the eight disciplines of business management, the seven elements of corporate governance, and the six principles of business measurement yields more than 300 perspectives—and the right connections—between business value and BI programs.

When examining the intersection of business management with corporate governance—financial management with compliance, for example—ask questions such as:

• What dependencies exist here?

• What decision processes need to be supported with information?

• What information is needed here? And what information is created here?

When looking at the intersection of business management with business measurement, ask questions such as:

• What are the related business strategies, and what information supports them?

• What information tracks achievement of goals?

• What information discovers opportunity?

At the intersection of corporate governance with business measurement, explore questions such as:

• What information exposes risk?

• How does information enable compliance?

• How does information support business policies and procedures?

Systematic attention to business management and corporate governance first, followed by consideration of business measures, and finally the technology to deliver measures, will build BI systems that are truly business driven—putting the business back into business intelligence.

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The archetypal sci-fi thriller *Brave New World* foretold a reality vastly different from the one author Aldous Huxley saw around him. Years later, he would comment on just how quickly so many of his prescient predictions came true. How time flies.

The same holds true for the realm of business intelligence (BI). Still a fledgling industry by many accounts, BI stands poised for dramatic change. In fact, according to market watcher International Data Corp. (IDC), we’re currently afloat in new and uncharted BI waters.

IDC says the BI marketscape evolves in 15-year epochs or “waves.” The first of these, the market watcher says, lasted from 1975 until around 1990. This epoch was mostly concerned with production reporting on mainframe systems, but the second wave—which IDC says subsided just last year—saw the beginning of the “modern era” of BI, in which a new breed of end user–oriented, client-server tools supplanted and extended the production-centric roots of paleo-BI with more sophisticated query, reporting, and OLAP capabilities.

Get ready for the next wave of business intelligence, which—by 2020, IDC states—will once and for all take BI mainstream, with query, reporting, and analysis dashboards on every desktop. “When we look back in a few years, we’ll see that 2005 was another turning point in the BI market and the beginning of the new wave of investment in BI by organizations in all industries,” writes IDC analyst Dan Vesset. “The current market cycle is expected to last until 2020, and will be focused on expanding the reach of BI to more users both inside and outside the organization, and a move to automate more decision processes by combining QRA [query, reporting, and analysis] and advanced analytics functionality.”

In its first two epochs or waves, BI was mostly the province of analysts, managers, and other
power users. That’s already starting to change, Vesset says, and—thanks to the growing ubiquity of reporting and dashboarding solutions—could be a distant memory in a decade’s time.

“[A]nalysts and managers represent only a relatively small portion of an organization, estimated at about 15 to 20 percent of employees. In fact, IDC believes that the market for reporting and OLAP tools for power users and analysts has reached a level of maturity that cannot sustain the growth rates of the past in terms of new license revenue,” he writes.

This might be one reason why the big BI ISVs are talking more seriously than ever about finally making good on the promise of BI for the masses. But the mainstreaming of BI—and the attendant explosion of BI-related revenues—will attract bigger fishes, too. This could put the squeeze on some smaller best-of-breed players. “Instead, larger IT vendors such as Microsoft, Oracle, and IBM along with the existing specialty BI vendors are now targeting this market. As the market continues to mature, it is highly likely that the larger IT vendors will continue to gain share,” Vesset speculates.

TDWI faculty member Stephen Few, principal of Perceptual Edge, notes: “BI for the masses will suffer the same problems that currently plague BI for analysts and power users, unless software vendors change their approach. What we have today are BI tools that don’t work nearly as well as they should, even for analysts and power users. The reason they haven’t reached the masses isn’t because vendors haven’t attempted to reach the masses, but because most of the tools are so difficult to use and reveal so little about the data that only power users are willing to put up with them.”

Meanwhile, Cindi Howson, also a TDWI faculty member and president of BI consultancy ASK, comments: “Just as things had to happen with cell phones before they became mass products or the Compaq Portable II… the same is true with the BI suite. Lowering the price is one thing and I think we are seeing that in per-seat licenses. Usability and relevance, though, are other things that need to be addressed.”

Former TDWI keynoter and regular faculty member Dan Merriman wrote this in an e-mail sent to BI This Week: “The functionality and usability of the technology is critical. However, success is also dependent upon the ability of companies to 1) define and use sets of metrics that measure actual business results while also providing users with insight into where they should focus to improve results (e.g., leading indicators), 2) establish clear accountability for business metrics and targets, and 3) develop a culture of performance measurement and continuous improvement. If the focus is on the technology alone, it is destined for the shelf.”

Mark Madsen, president of Third Nature and another member of the TDWI faculty, writes: “To provide better BI outside of standard reports will definitely take some serious retooling of these products and interfaces. If you can’t figure out how to get what you need in a couple of minutes, the product probably doesn’t belong in the hands of the front-line employees.”

“[P]eople are being trained by the simplicity of online interfaces that do a lot behind the scenes to make the experience simpler. As new developers get into BI companies, they’ll bring along different expectations and ideas.”

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“I think we’ll see a shift, though,” continues Madsen. “People are being trained by the simplicity of online interfaces that do a lot behind the scenes to make the experience simpler. As new developers get into BI companies, they’ll bring along different expectations and ideas. The products can only get better. They pretty much have to. We’re still looking at the online equivalent of greenbar reports.”

There’s a lot of work yet to be done, Vesset agrees. “Whether we’re talking about information workers with higher levels of freedom to decide about their daily workflows and processes or line-of-business employees who may be restricted by systems and policies in how they perform their duties, a vast population exists whose business intelligence requirements have not been met to their full potential,” he argues. But as vendors gear up to deliver BI solutions
optimized for rank-and-file employees (as well as important organizational stakeholders like suppliers, partners, and customers), they’ll be forced to rethink—and possibly re-architect—many of their existing solutions, Vesset predicts.

“This shift in market focus can be only partially addressed through existing BI software, which as already mentioned was created with the analyst or power user as the intended audience. Clearly a front-line employee will have limited use for an OLAP or an ad hoc query tool,” he says. “In fact, to address the needs of front-line employees and line-of-business managers, organizations must redefine and expand what they mean by BI. The expanded vision of BI must take into account not only the technologies involved, but also business drivers and performance management methodologies.”

But just why are businesses increasingly anxious to expose BI capabilities to as many users as possible? Vesset and IDC highlight a number of reasons, including the usual bugaboos (namely, compliance and competitive pressure from without), that are chiefly to account for the mainstreaming of BI. “BI can help drive consistency in decision making. It’s important to make correct decisions, but often it is also important that decisions are not made arbitrarily … [and] that different employees followed similar decision processes, which can be audited or monitored,” he points out.

And on the competitive front, companies are increasingly looking to equip users with tools that do more than just deliver information. This is consistent with the Dashboards 2.0 push that some industry prognosticators—such as TDWI’s own Wayne Eckerson—have predicted. “Within the process of performance management, it is important to go beyond simply dashboards and reports that focus only on information delivery,” says Eckerson. “To put BI into an operational context, it’s not enough to have dashboards that simply report on what happened. This information is valuable but of limited use. Dashboards should also show context around the information and provide guidance for action. In other words, they need to be in the context of whatever business process the dashboard is built for and support predictive analytics.”

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Actuate introduces the Collaborative Reporting Architecture, which harnesses the power of the Eclipse Business Intelligence Reporting Tools (BIRT) Open Source project while offering significant new deployment opportunities to customers.

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