

Enterprise Business Intelligence: Strategies and Technologies for Deploying BI on an Enterprise Scale

By Wayne W. Eckerson with Cindi Howson



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About TDWI

The Data Warehousing Institute (TDWI), a division of 101communications LLC, is the premier provider of in-depth, high-quality education and training in the business intelligence and data warehousing industry. TDWI is dedicated to educating business and information technology professionals about the strategies, techniques, and tools required to successfully design, build, and maintain data warehouses. It also fosters the advancement of data warehousing research and contributes to knowledge transfer and the professional development of its Members. TDWI sponsors and promotes a worldwide Membership program, annual educational conferences, regional educational seminars, onsite courses, solution provider partnerships, awards programs for best practices and leadership, resourceful publications, an in-depth research program, and a comprehensive Web site.

About the TDWI Report Series

This series is designed to educate technical and business professionals about new business intelligence technologies, concepts, or approaches that address a significant problem or issue. Research for the reports is conducted via interviews with industry experts and leading-edge user companies, and is supplemented by surveys of business intelligence professionals.

To support the program, TDWI seeks vendors that collectively wish to evangelize a new approach to solving business intelligence problems or an emerging technology discipline. By banding together, sponsors can validate a new market niche and educate organizations about alternative solutions to critical business intelligence issues. Please contact Wayne Eckerson if you would like to suggest a topic that meets these requirements.

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Most Organizations Have Deployed BI on a Departmental Scale

Executive Summary—BI for All!

Since its inception, business intelligence (BI) has promised to empower workers by giving them direct access to information they can use to make better decisions, create more effective plans, and respond more quickly to problems and opportunities. Many organizations have reaped some of these benefits, but in a piecemeal way. They have deployed pockets of BI on a departmental scale, creating a tremendous overlap of technology and information that costs the organization both financially and strategically.

Back and Front Ends. Today, smart companies are trying to streamline their use of BI technology. On the back end they are trying to consolidate numerous analytic silos into an enterprise data warehousing environment that provides a consistent view of information. On the front end, they are trying to consolidate the number of query, reporting, and analysis tools (that is, BI tools) to save money, simplify end-user navigation and training, respond more quickly to ad hoc requests, and provide a standard set of information throughout the enterprise.

From the Department to the Enterprise. Eager to reap the full benefits of business intelligence, two-thirds of organizations now want to transform BI from a departmental to an enterprise initiative. Last year, TDWI published a report that focused on back-end standardization issues, *In Search of a Single Version of Truth: Strategies for Consolidating Analytic Silos*. In contrast, this report focuses largely on the front end of business intelligence, where the substantial challenges involve standardizing the use of BI tools.

Today, Organizations Average 3.2 BI Tools from Different Vendors and 13 BI Tools Altogether

Today, organizations average 3.2 BI tools from different vendors and 13 BI tools altogether. They average almost three online analytical processing (OLAP) and production reporting tools, two dashboard/scorecard and query/reporting tools, and 1.5 data mining and planning/modeling tools. The good news is that organizations have slowly been consolidating their purchases among a few vendors, and most plan to standardize on one tool per functional BI category within three years.

Challenges. But there are many challenges to standardizing on BI tools, and organizations pursue a number of strategies. Most organizations “grandfather” existing, nonstandard BI implementations by requiring only new projects to conform to the standard. Most also are turning to Web-based dashboards and scorecards and custom BI solutions to give large numbers of casual users a more intuitive interface that conforms to the way they work and prefer to interact with information.

Organizations are also spending much more time carefully evaluating the scalability, performance, and suitability of BI tools and solutions before deploying them on an enterprise scale. Recognizing a pent-up need for enterprise BI tools, leading vendors are responding by providing BI platforms that consist of integrated suites of Web-based tools running on a common set of application services that can be customized to meet the information and analytical requirements of large numbers of individuals and groups.

Although many organizations are years away from delivering a standard enterprise BI environment, most recognize that they need to head in this direction. They know enterprise BI is the key to unlocking the full potential of information to enhance worker productivity, optimize processes, and achieve strategic objectives and goals.

Research Methodology

Report Scope. This report is designed for technical executives who wish to learn how to transform business intelligence (BI) from a departmental solution to an enterprise one. The report describes techniques for selecting and standardizing enterprise BI tools, creating a scalable, enterprise-caliber BI platform, and delivering tools that end users will really use.

Methodology. The research for this report is based on a survey that TDWI conducted in the winter of 2005, as well as interviews with BI practitioners, consultants, industry analysts, and report sponsors. TDWI defines business intelligence as an umbrella term encompassing both data warehousing and query, reporting, and analysis tools and applications, which most people refer to as BI tools. We will use the term BI to refer to both the umbrella concept and query, reporting, and analysis tools.

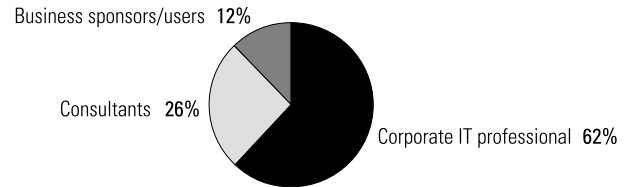
Survey Methodology. TDWI contacted BI professionals in its database and 101communications' database. (TDWI is a business unit of 101communications.) A total of 668 people responded to the survey. However, we did not count results from the 74 respondents who are sales or marketing representatives from BI vendors or consultancies, professors, students, or BI professionals whose organizations had "no plans" for BI. In total, we had 594 qualified respondents.

Survey Demographics. A majority of the qualified survey respondents (62 percent) are corporate IT professionals. The remainder are BI consultants (26 percent) and business sponsors/users (12 percent). Most of the qualified respondents work in corporate IT (60 percent).

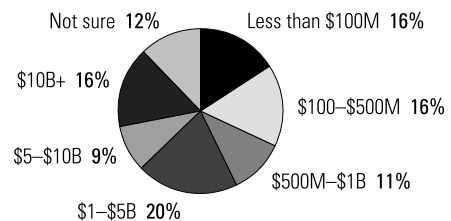
About one-third of respondents (32 percent) work at companies with revenues of less than \$500 million. Another one-third (31 percent) work at companies earning between \$500 million and \$5 billion in revenues. The remainder work at companies with more than \$5 billion in revenues (25 percent) or don't know the revenues of their firms (12 percent). Most respondents are based in the U.S. (63 percent) and work in a range of industries, but the largest percentage are in financial services (16 percent). Consultants (8 percent of respondents) were asked to fill out the survey with their most recent client in mind.

Demographics

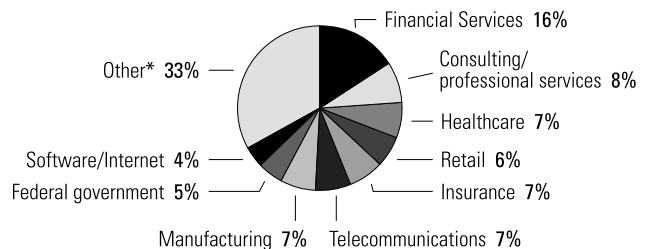
Position



Company Size by Revenue

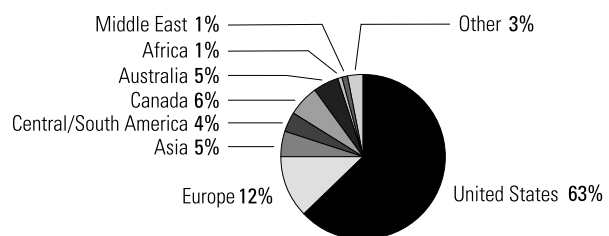


Industry



* The "other" category consists of industries with less than 3 percent of respondents.

Geography



Based on 594 qualified respondents.

Moving BI to the Enterprise

Evolution of Business Intelligence

Business intelligence (BI) is an umbrella term that encompasses the processes, tools, and technologies required to turn data into information, and information into knowledge and plans that drive effective business activity. BI encompasses data warehousing technologies and processes on the back end, and query, reporting, analysis, and information delivery tools (that is, BI tools) and processes on the front end.

This report focuses largely on the front-end BI environment and BI tools. However, it often steps back and puts BI tools into the context of the entire “BI environment” or “BI solution”—in other words, both the back and front ends of business intelligence.

Self-Service Information. The purpose of BI, as conceived in the early 1990s, was to give business users direct access to information instead of having to go through the IT department to obtain custom reports or views of information. The idea was to empower business users by allowing them to query a repository of integrated data (i.e., a data warehouse or data mart) and create their own reports. Giving business executives, managers, and staff self-service access to information would enable them to avoid the backlog in the IT department, and enhance their ability to make decisions, create effective plans, and optimize processes and performance.

Early BI Tools Overwhelmed Users with Features

In reality, however, self-service BI proved overwhelming for all but the most sophisticated power users. Most users found the original query, reporting, and analysis tools (that is, BI tools) too complex or time-consuming to use. Since they didn't use the tools intensively, they would forget how to log on or use various functions and features. They might also spend too much time looking for the right report among hundreds, or get lost in an endless series of drill-downs and dimension lists. Rather than empower users, early BI tools overwhelmed them. This was a result of sloppy implementation and feature-heavy BI tools.

BI for the Masses. In the past five years, many BI tools vendors have responded to these complaints by making their product lines more friendly to the majority of users in the enterprise, not just power users. They've developed BI platforms that provide a scalable and consistent set of application services—including report and application design, security, administration, metadata management, broadcasting, collaboration, query management, Microsoft Office integration, versioning, usage monitoring, and load balancing—that support a variety of BI tools and solutions to meet the needs of different types of users in an enterprise environment. The result is that many organizations can now confidently extend the benefits of BI tools to a majority of their employees throughout the enterprise.

BI Is Now a Mainstream Business and IT Discipline

Maturing Market. Thus, what started largely as a grassroots effort by business users to circumvent the IT department has grown into a mainstream business and IT discipline, and a full-fledged industry with hundreds of vendors and consultancies pitching a variety of tools, technologies, and methodologies for delivering BI solutions. International Data Corp., a leading IT market

research firm, predicts that the BI tools market will grow to approximately \$5 billion in 2007.¹ When you include sales of databases, servers, and tools related to data warehousing and BI solutions, the market easily exceeds \$100 billion annually.

Analytic Silos

Scattershot Deployments. However, despite the popularity of BI, most organizations have not deployed BI tools and solutions in a systematic or consistent manner. They have allowed individual workgroups, departments, and divisions to build their own data warehouses and data marts, purchase their own BI tools, create their own BI applications, and define key metrics, data elements, and business views in unique, nonstandard ways. Thus, although BI usage has increased overall, BI deployments remain small and disconnected. Many organizations today are riddled with these “analytic silos.”

Even when an organization has resisted delivering BI solutions in a scattershot manner, business events have intervened, making it impossible to deliver consistent information using a standard set of BI technologies and processes for collecting and integrating data for analysis purposes. Mergers, acquisitions, reorganizations, executive turnover, and other forces perpetually undermine the organization’s attempts to deliver a universal BI solution and avoid analytic silos.

BI Vendors. In addition, BI tools vendors sometimes exert tremendous influence over organizations, especially the uninitiated, who believe that purchasing a BI tool is the only thing they need to do to implement a BI solution. Without strong central controls, many organizations find themselves in possession of a half-dozen or more BI tools associated with multiple, redundant data marts and data warehouses. This not only makes BI a target of cost-conscious CFOs, but it also undermines an organization’s ability to deliver a consistent view of information for reporting and analysis.

Data Redundancy. In short, the proliferation of analytic silos with their redundant BI tools and data structures threatens to undermine the promise of BI to deliver business insight and value to the enterprise. TDWI research shows that on average organizations have 2.1 data warehouses, 6 independent data marts, 4.5 operational data stores, and 28.5 spreadmarts.² Many organizations report that they have many more analytic silos than this, especially spreadmarts (i.e., spreadsheets that function as independent data marts), which in many cases are too numerous to count.

Tool Redundancy. Invariably, each analytic silo uses a different set of BI tools, leading many BI professionals to complain that their organizations have one of every kind of BI tool imaginable. TDWI research shows that organizations have an average of 3.2 BI tools from different vendors.

Although BI Usage Has Increased, BI Deployments Remain Small and Disconnected

BI Vendors Sometimes Have Substantial Influence on BI Purchases

The Proliferation of Analytic Silos and BI Tools Undermines the Promise of BI

The Number of BI Tools Increases with Company Size

¹ IDC’s estimate includes \$4.7 billion for “data warehouse access BI” and “production BI” combined, and approximately \$500 million for business performance management, which includes dashboards and scorecards. Estimates are based on both license and maintenance fees. From “Worldwide Business Analytics Software 2004–2008 Forecast and 2003 Vendor Shares” and “Worldwide Finance and Business Performance Management Analytic Applications 2004–2008 Forecast,” International Data Corp.

² Wayne Eckerson, *In Search of a Single Version of Truth: Strategies for Consolidating Analytic Silos*, TDWI Report Series, November 2004. www.tdwi.org/research/reportseries

Not surprisingly, the average number of BI tools increases with company size, from 2.3 BI tools for organizations with less than \$500 million in revenues to 3.7 BI tools for organizations with \$5 billion or more in revenues. Obviously, bigger companies have more departments and business units that purchase BI tools separately. (See Table 1.)

Effect of Industry Consolidation. At first blush, 3.2 BI tools from different vendors doesn't seem like an unmanageable number, but this doesn't necessarily reflect the total number of BI tools a company has. Due to the consolidation in the BI industry, many best-of-breed BI tools that organizations purchased several years ago have been acquired by leading BI vendors and wrapped into a comprehensive BI suite. Thus, organizations often have two or three times as many BI tools as they have BI vendors.

Average Number of BI Tools by Company Size

| Revenues | <\$500M | \$500M to \$5B | \$5B+ |
|--------------------------------|---------|----------------|-------|
| Avg. number of BI tools | 2.3 | 3.1 | 3.7 |
| <i>Overall Average = 3.2</i> | | | |

Table 1. Organizations have an average of 3.2 BI tools from different vendors. The larger the company, the more BI tools it has. Based on 594 qualified respondents.

Excel Can Be a Legitimate BI Tool When Used as a Front End to an Analytical Server

The Excel Effect. These numbers don't necessarily count Excel as a BI tool, although it is the query, reporting, analysis, and planning tool of choice for most power users and managers; otherwise, the numbers would be higher. Unlike Excel-based spreadmarts, Excel can be a legitimate BI tool when used as a front end to an analytic server.³ After a long period of resistance, many BI vendors are now embracing Excel, as well as other Microsoft Office tools, and making them full-fledged BI clients in packaged suites. This greatly aids BI standardization efforts.

Organizations Plan to Standardize on One BI Tool per Category within Three Years

BI Tools by Category. The proliferation of BI tools is more obvious if we count BI tools by category instead of by vendor. (See sidebar, "Standardizing on Categories of BI Tools" on page 9.) The TDWI survey shows that organizations average almost three production reporting tools, three OLAP tools, two dashboard applications, two end-user query and reporting tools, 1.5 data mining tools, and 1.5 planning/modeling tools. Combining these figures with the previous chart, organizations have an average of 13 BI tools, with almost 4 BI tools or modules per vendor.

Category Consolidation. The good news is that organizations plan to standardize on one BI tool per category within three years (see Table 2). Organizations are most keen to standardize OLAP tools, which will decline to less than one tool per organization (0.99) in three years, suggesting that some organizations are abandoning OLAP tools altogether! Organizations will have less success standardizing production reporting tools (1.4 tools in three years) and planning/modeling tools (1.3 tools in three years). Production reporting tools are traditionally purchased by the IT department and may escape corporate standardization efforts; and planning/modeling tools are currently dominated by Excel and Access, which are difficult to curb.

³ Wayne Eckerson, "Getting Control of Runaway Spreadsheets," SearchCIO.com, May 2005. This article presents strategies for curing spreadmarts, including techniques for using Excel as an analytical client.

Number of BI Tools per Category

| | Today | In Three Years | Change |
|------------------------------------|-------|----------------|--------|
| OLAP | 2.7 | 0.99 | -63% |
| Production reporting | 2.8 | 1.4 | -50% |
| Dashboards/scorecards | 2.1 | 1.1 | -48% |
| Query & reporting tools | 2.1 | 1.2 | -43% |
| Data mining tools | 1.6 | 1.2 | -25% |
| Planning/modeling tools | 1.5 | 1.3 | -13% |

Table 2. Organizations plan to consolidate OLAP tools the most, followed by production reporting and dashboards/scorecards. Based on 594 respondents.

Standardizing on Categories of BI Tools

Most organizations standardize on a set of BI tools instead of a single BI tool. The reason is that different types of users require different types of BI tools (reports, ad hoc query, OLAP) and different modalities (author, editor, navigator, viewer) within each tool. (See also sidebar, "Fitting BI Tools to Users," on page 18.) Consequently, organizations try to select a single tool in each BI category that offers multiple modalities.

To meet these requirements, leading BI vendors now offer BI platforms that support tools in each category, allowing organizations to standardize on a single BI platform and a single BI vendor. However, some organizations still pursue a best-of-breed strategy in which they select BI tools in each category from different vendors.

Following are the major categories of BI tools. These definitions were also provided in the survey on which this report is based.

- **Production Reporting Tools**
Used by professional developers to create standard reports for groups, departments, or the enterprise.
- **End-user Query and Reporting Tools**
Used by end users to create reports for themselves or others; require no programming.
- **OLAP Tools**
Allow end users to "slice and dice" data dimensionally to explore data from different perspectives and time periods.
- **Dashboard/Scorecard Tools**
Allow end users to view critical performance data at a glance using graphical icons and drill down to analyze detailed data and reports if desired.
- **Data Mining Tools**
Allow statisticians or business analysts to create statistical models of business activity.
- **Planning and Modeling Tools**
Allow analysts and end users to create business plans and simulations against BI data. Planning tools supply dashboards and scorecards with targets and thresholds for metrics.

Organizations Can Now Standardize on a Single BI Toolset and a Single BI Vendor

Expanding the BI User Base

While organizations are trying to reduce the number of BI tools they possess, they are also looking to expand the number of users who leverage BI tools to make decisions. Expanding the use of BI from power users to all users is an important priority for organizations that want to empower knowledge workers with relevant and timely information to make quality decisions and improve performance.

On average, organizations plan to boost the number of BI licenses they purchase for potential BI users from 41 percent today to 60 percent in three years, a sizable increase. At the same time, organizations also want to increase adoption rates among existing BI users. Today, only 45 percent of licensed BI users use the tools on a regular basis (i.e., weekly). In three years, organizations plan to expand regular BI usage to two-thirds (65 percent) of licensed BI users. (See Illustration 1.)

In Three Years, 39% of All Employees Will Be Active BI Users

Doing the math, this means that currently an average of 18 percent of potential BI users actively use BI tools, but this will double to 39 percent in three years. Even if our respondents are overly optimistic (which is usually the case), this is still significant growth in the penetration and use of BI tools.

BI Penetration and Use



Illustration 1. Organizations plan to deploy BI tools to a majority of their employees in three years. Based on 594 responses.

Characteristics of Enterprise BI Tools. The key to increasing the penetration of BI tools is multifaceted. In the past, the lack of adequate training, overly complex BI tools, and deep per-seat discounts offered by vendors contributed to an abundance of BI shelfware. In the future, organizations need to make sure they deploy BI tools and applications that are fast, intuitive, and customized to a user’s role in the organization. The BI tools and applications must also provide access to timely, relevant, and accurate information and be able to reach into operational systems, if required.

Push Approach. In scaling BI environments, organizations often try a “push” approach in which they convert a standard report to a PDF or Excel document and e-mail it to multiple recipients in either an automated or manual fashion. This lets organizations deliver the output of BI tools to additional employees without increasing their BI licenses. However, two factors are slowing the adoption of the push approach to BI: some BI vendors are now charging “recipient” licenses for these indirect users; and users sometimes think these “pushed” reports are spam. Accordingly, the percentage of indirect or recipient BI users will drop slightly from 58 percent today to 52 percent in three years, while the percentage of direct users will increase inversely. (See Illustration 2.)

Direct versus Indirect BI



The Trend Is to Empower Users by Giving Them Interactive, Web-based BI Reports via Portals, Dashboards, and Scorecards.

Illustration 2. The percentage of users who access BI information directly will increase, while BI recipients will decrease. Based on 594 responses.

Pull Approach. Instead, the survey shows that the trend is to empower users by giving them Web-based BI tools and analytic applications. The percentage of Web BI users will increase from 55 percent today of all potential BI users to 70 percent in three years. Conversely, the percentage of desktop users will drop from 45 percent to 30 percent in three years. (See Illustration 3.) The Web has been a boon to BI because it reaches anyone with a browser, including customers and suppliers, and eliminates the need to install software on users’ desktops, cutting implementation times and reducing support costs. The Web makes it easy to deploy BI dashboards, scorecards, and portals that contain key metrics and reports, as well as domain-specific analytic applications (such as finance, sales, and marketing) that leverage BI tools.

Web versus Desktop

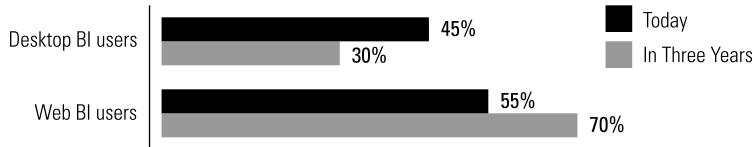


Illustration 3. The Web is quickly becoming the primary BI platform. Based on 594 responses.

Taking Action

During the past several years, executives have begun to understand the ramifications of deploying BI in a haphazard manner. Analytic silos and redundant BI tools increase costs through redundant technology, staff, suppliers, and processes and undermine the consistency and accuracy of information. Most executives now recognize the benefits of moving from a disjointed approach to BI to a more coordinated one. Many are now intent on standardizing the delivery of BI on an enterprise scale, making it a strategic purchasing decision.

“Senior management wanted consistency across departments, reports, and measures to facilitate communication and decision making,” says Dirk de Wilde, data architect at Canadian National Railway Company (CN), which several years ago had 17 independent data marts running on various platforms and database management systems.

Today, CN has a single enterprise data warehouse (EDW) that integrates data from more than 15 source systems, supports 15 dependent star-schema data marts, and delivers reports and queries to more than 2,000 users. Strategically, the EDW supports an executive performance management system that generates hundreds of standard KPIs for executives and managers throughout the firm. “Everyone now looks at the same metrics and data,” says de Wilde.

Two-Thirds of Organizations Plan to Transform BI into an Enterprise Resource

Migrating to Enterprise BI. TDWI research shows that two-thirds of organizations (66 percent) are now trying to transform BI from a departmental solution to an enterprise one. Only 17 percent of organizations have completed the task, while the remaining 17 percent will continue to deploy BI departmentally. This data shows that BI has a ways to go until it reaches maturity in most organizations. (See Illustration 4.)

Is your organization trying to transform BI from a departmental to an enterprise initiative?

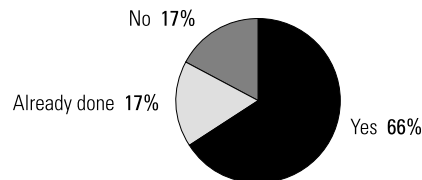


Illustration 4. Based on 594 respondents.

What Is Enterprise? Of course, the term enterprise is ambiguous, which you need to keep in mind when interpreting the survey data. An enterprise solution is an ever-widening circle that depends on one’s perspective. For instance, people who work in a worldwide business unit or a functional area that spans all business units might consider their group’s data warehouse and BI tools to be an enterprise solution. But the CEO of the corporation might see these “enterprise solutions” as analytic silos if they don’t deliver a consistent view across the entire business.

An Organization Might Have Multiple “Enterprise” BI Solutions and Yet No Single Version of the Truth

In effect, one organization might have multiple “enterprise” BI solutions and yet no single version of the truth. Ultimately, an enterprise BI solution needs to span the entire organization across various functional areas and user segments, addressing both front-end and back-end architecture and delivery methods. That’s because the CEO will eventually want an integrated view of the entire organization. This is the real definition of “enterprise.”

Indicators of Success. One of the major indicators that organizations are on the right track toward delivering an enterprise BI solution is their ability to standardize on BI tools. Using BI tools as a gauge, some organizations have made progress, but a majority have a long way to go.

Today, a third of organizations have standardized on OLAP and production reporting tools, and only about one quarter have standardized on end-user query and reporting tools. Even smaller percentages have standardized on dashboards/scorecards, data mining tools, and planning/modeling tools. (See Illustration 5.)

When Do You Plan to Standardize Various BI Tools?

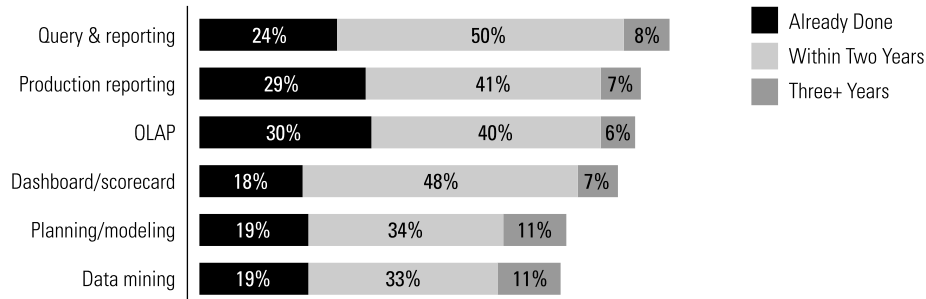


Illustration 5. Organizations have made the greatest headway standardizing OLAP, production reporting, and end-user query and reporting tools, but a majority still have work to do. The remaining respondents in each category had “no plans” to standardize those BI tools. Based on 594 respondents.

Within two years a majority of organizations will have established standards for OLAP, production reporting, end-user query/reporting tools, and dashboards/scorecards, which are currently experiencing explosive growth. Data mining tools are used by only a fraction of end users, so few organizations are in a rush to standardize these tools. Planning and scenario modeling applications are dominated by Excel and Access, which accounts for the slow rate of standardization in this category.

Within Two Years, Most Companies Will Establish Standards for Most Categories of BI Tools

Running Upstream. However, not all organizations are trying to reduce the number and variety of BI tools. Alstom Power, for example, is actually increasing the number of BI tools it supports rather than reducing them. To better map BI tools to users, Alstom defines “points of interest” that specify information usage based on business processes. Points of interest include the creation of forecasts that require writing information back to the database, viewing static status reports and adding comments, and interacting with report information.

“As we better understand and meet user requirements, we find we are able to reduce the total number of BI licenses even though we are increasing the number and diversity of BI tools in our organization,” says Michael Sykes, U.S. manager of data warehousing at the company.

The Benefits of Enterprise Business Intelligence

The more an organization standardizes on all components of a BI solution—data, metrics, models, architectures, technologies, and processes—the more benefits it reaps. Although various groups may have to sacrifice their individual ways of doing things, which is always painful, the organization as a whole gains in innumerable ways.

TDWI’s BI Maturity Model shows why it takes organizations many years to establish a mature BI solution. In the early stages, end users purchase their own BI tools or use Microsoft Excel or personal databases to access information at relatively low cost, allowing them to circumvent enterprise standards, if any exist. Once users become dependent on the BI tools and the data and reports they generate, most will resist the organization’s attempt to standardize or change the way they view and manipulate the information. (See Illustration 6.)

TDWI's BI Maturity Model—Local Control versus Enterprise Standards

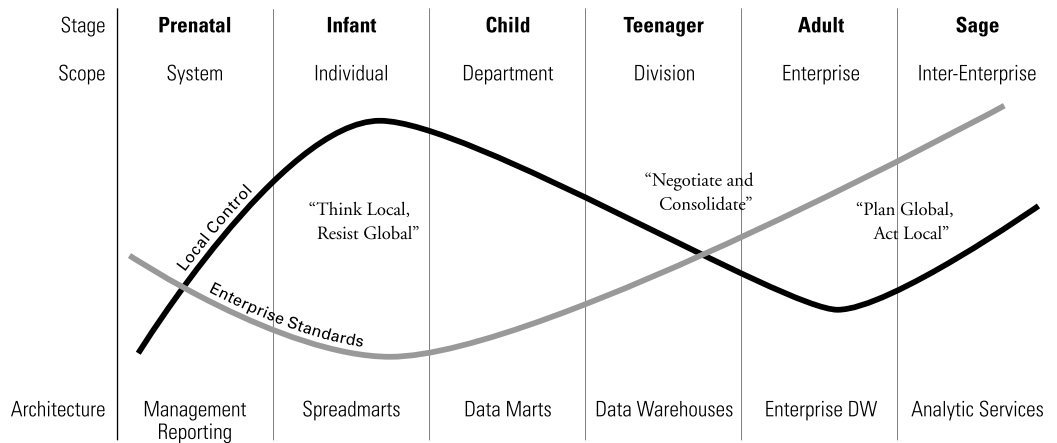


Illustration 6. In the early phases of a BI deployment, BI tools give business users a lot of local control over the management and delivery of information. But as the organization tries to deploy information to more users, it needs to standardize the technology, tools, and processes, eroding local control and empowerment. Only in the most mature phases does a BI solution adequately meet local requirements without sacrificing enterprise standards.

Standardization Offsets the Loss of Local Control Only in Mature BI Environments

Only in the mature stages does standardization deliver sufficient benefits to offset the loss of local control. This occurs when there is a robust BI infrastructure in place and most of the information that users need already exists in a data warehousing environment, so the hard, time-consuming work of preparing data for querying and analysis is completed. (By the way, the data warehousing environment doesn't have to be a monolithic database; it can be a federated environment, in which data is both centralized in a data warehouse and distributed among multiple systems and pulled together on demand to populate dashboard metrics or reports via various types of data integration services.)

Increased Agility and Responsiveness. With a mature BI infrastructure, organizations can rapidly deliver new reports in days or hours to meet the ongoing fusillade of new user requirements. The IT department can reuse application templates and components to rapidly create production reports and applications, and they can establish and train a network of "super users" to create ad hoc reports for colleagues in the departments (more on this later). Here, a standard enterprise BI architecture can rapidly adapt to meet the diverse needs of individuals and groups without sacrificing enterprise standards.

A Cornucopia of Benefits. Once an organization balances local requirements with enterprise standards, it reaps a multiplicity of benefits that enhance individual performance and boost corporate productivity. Specifically, an enterprise BI solution provides the following key benefits:

An Organization That Balances Local Needs with Enterprise Standards Reaps Many Benefits

- 1. Delivers Consistent Information.** In an enterprise BI solution, all business users work off the same set of metrics and reports, which become a common vocabulary for the organization to make sound, rapid decisions. Executives no longer have to watch the business become paralyzed by a cacophony of conflicting data. The enterprise BI tool relies on this consistent information rather than replicating its own version of the truth.
- 2. Improves Communication.** When everyone works off the same information, meetings run more efficiently. No one spins the data to protect their turf, because everyone has access to the same data at the same time. Meetings focus on refining strategies, creating plans, and solving problems instead of refereeing disputes about the data.
- 3. Saves Time and Money.** An enterprise BI system frees up the time that analysts and managers previously spent collecting and integrating data into their own conflicting reports. Many organizations have justified an entire BI projects on the money saved by liberating analysts and managers from functioning as “human data warehouses” and by consolidating redundant analytic silos. BI purchasing is centralized to leverage volume discounts, and development, support, and infrastructure costs decline overall.
- 4. Enables Fact-based Decision Making.** With consistent, easily accessible information, users no longer have to rely on intuition and gut feelings to make critical decisions and plans. Now, they can validate or refine their intuition with facts and projections gleaned from consistent data, make smarter decisions, and devise better plans.
- 5. Provides Actionable Information.** An enterprise BI solution delivers the right information to the right person at the right time. These systems blend historical and event-driven data so users get access to information in a timely fashion. This enables users to intervene to fix problems or exploit opportunities before it's too late.
- 6. Aligns the Business.** Actionable information empowers business users to work more efficiently to achieve strategic and tactical objectives and optimize performance. Dashboards and scorecards focus workers at all levels within an organization on the objectives and metrics that drive the most business value and compare performance to targets and thresholds devised in planning tools.

An Enterprise BI Solution Delivers the Right Information to the Right Person at the Right Time

Few executives will dispute the value of these benefits of an enterprise BI solution. An enterprise BI solution equips organizations to better serve their customers and compete more effectively. However, the trick is to translate desire into action by standardizing dozens of independent initiatives into a highly orchestrated enterprise BI solution.

Turning Business Intelligence into an Enterprise Resource

Once they understand the benefits of enterprise BI, many executives want to deploy a solution immediately. Unfortunately, it often takes several years for an organization to gain the experience and skills and build the technical infrastructure required to deliver an enterprise solution and reap its benefits. TDWI's Maturity Model defines six stages that organizations pass through on their way to a mature BI deployment. Only when organizations reach stage five—the “adult” stage—can they begin to roll out BI on an enterprise scale.⁴

Although a discussion of all the steps required to achieve BI Maturity is outside the scope of this report, we will highlight a number of tasks that organizations must undertake to transform BI from a departmental resource to an enterprise one. Much of the advice below involves aligning the BI solution with business strategy and making sure the business, not the IT department, owns the solution and guides the IT project teams during implementation and beyond.

1. The Business Must Recognize the Need. The most important—and often the most overlooked—requirement for creating an enterprise BI solution is to make sure the business understands the need for such a solution. Although the IT department and select business managers may recognize the need for consistent information and standard tools, technologies, and processes, the project won't get off the ground unless key executives share the vision and lead the charge.

Executives Often Aren't Motivated Until They Feel Substantial Pain from Lack of an Enterprise BI Solution

Executives often aren't motivated until they feel substantial pain from the lack of an enterprise BI solution. “Our executives got frustrated because it took five to six days at the end of the month to get a revenue report,” says Sapana Patel, director of application services at Interval International, a membership-based travel services firm in Miami that recently deployed a series of executive dashboards and other reports based on a new enterprise data warehouse and standard set of BI tools. “Now, when they arrive in the morning, they can quickly check the key metrics driving their business and know what issues they need to track or address during the day.”

2. Strong Executive Support. Once the business feels sufficient pain to take action, a strong and committed executive needs to spearhead the initiative and evangelize the BI solution. The executive needs to have sufficient clout, be well respected, have many allies and few enemies, and make a clear business case. The executive needs to appoint a trusted business driver to oversee the project who devotes 50 percent of his or her time to executing the business plan.

“I'm fortunate to have strong backing from our top executives,” says Interval International's Patel. “They drove a lot of our information requirements and mandated a standard solution in the face of some internal resistance.”

Although IT Needs to Administer and Support the BI Solution, the Business Needs to “Own” and Drive It

3. The Business Must Own the Initiative. Besides evangelizing the BI solution, the business sponsor needs to assume accountability for the outcome of the project and recruit (or strong-arm) other business executives and managers to support the initiative. At this point, executives should avoid making the mistake of turning the BI project over to the IT department. Although IT needs to administer and support the BI solution, the business needs to own and drive it.

⁴ Wayne Eckerson, “Gauge Your Data Warehousing Maturity,” *TDWI's Case Studies & Solutions*, August 2004. www.tdwi.org/publications/newsletters

Many organizations establish a variety of business-driven steering committees to manage an enterprise BI initiative. For example, Alstom Power created a data warehouse council in 2004, comprising business executives and managers, to set the direction and strategy for a new enterprise data warehouse, which consolidated numerous data warehouses, reporting repositories, BI tools, data marts, and Access databases into a single enterprise resource.

“We needed to move ownership away from the IT department to the business. Now, the IT group only implements and manages the system on behalf of the business,” says Alstom’s Michael Sykes.

4. Gather Requirements and Set Strategy. To deliver an effective enterprise BI solution, organizations need to treat the project strategically. They need to interview a cross section of users, establish priorities, and create a project plan that delivers the desired information, functionality, and applications in an incremental fashion. Unfortunately, many organizations believe the only thing they need to do to implement a BI solution is select and purchase a BI tool, which is actually the last step in a long process.

Interval International was heading in this direction until Patel attended a TDWI conference and learned the importance of first establishing a BI strategy and project plan that aligns with business goals and objectives. “After the conference, we reassessed our project and selected a BI vendor whose offerings met the information requirements of the entire organization. We established a partnership with the vendor, who helped us develop a road map and strategy and validated our tool selection process.”

5. Standardize and Validate Data. One of the most challenging aspects of delivering an enterprise BI solution is getting various business groups to agree on definitions for common data elements, such as “customer,” and rules for calculating common metrics, such as sales or net margin. This is often a politically charged task that requires the executive sponsor to referee between various business groups and establish enterprise standards.

“We have two distinct businesses—commercial and government—and the measurements each uses are very different, which makes it very challenging to develop corporate-wide standards,” says John Monczewski, manager of Balanced Scorecards at Booz Hamilton Allen. “We’ve had strong backing from our CEO to make this work and we’ve made a lot of progress. But even with that, it takes a lot of time. Our partners have decided to postpone trying to resolve some issues until a later time.”

Once definitions are standardized, IT must maintain them centrally and update tools in the BI environment if and when the definitions change. Unfortunately, there is no good way to automate the management of this metadata, so the process is manually intensive. The IT group must also validate incoming data and ensure that proper rules and checks are in place to preserve data integrity and quality in the data warehousing environment.

6. Standardize Architecture, Processes, and Success Criteria. Once an organization agrees on definitions, it needs to establish a standard BI architecture and processes for delivering a consistent view of information to end users. This involves defining the flow of data from source systems through a data integration infrastructure to reports and end users. It also involves defining standards for the use of technology to manage these data flows.

**Some Companies
Wrongly Believe the
Only Thing They Need
to Do to Implement an
Enterprise BI Solution
Is Buy a BI Tool**

**Once Definitions Are
Standardized, IT Must
Maintain Them Centrally
and Update Other Tools
When Changes Are Made**

Boeing Corporation uses a BI center of excellence to promulgate enterprise standards for BI technology and processes as well as provide resources, services, and advice to groups that want to implement BI solutions. The center is staffed by 35 people with various BI skills who are loaned to different groups throughout Boeing on a temporary basis. The key is to intervene before groups get too far into the process and deviate from corporate standards and best practices.

“Every group faces time and resource constraints that cause them to want to revert to the tools and techniques with which they are familiar despite our enterprise standards,” says Harvey Kriloff, information architect at Boeing.

BI Tools Should Conform to the Way Users Want to Work and Not Force Them to Conform to the Way the BI Tool Works

7. Make BI Tools Conform to Users. The hardest part about deploying a BI solution is getting employees to use the tools. BI tools should conform to the way users want to work and not force them to conform to the way the BI tool works. In this regard, a mistake that many organizations have made is to distribute a single BI tool or solution to all users and expect it to work. This is usually a recipe for disaster, since different types of users (executives, managers, power users, frontline staff, customers, and so on) use information in very different ways. Unfortunately, many organizations have learned the hard way that one size does not fit all.

“Our BI tools were a mismatch for our users,” says Alstom Power’s Michael Sykes, who admits that his group originally issued a single BI tool to all users when they first deployed a data warehouse. It wasn’t long before they purchased other tools to meet user requirements, but that still didn’t work. “The tools were overbearing for what most users are trying to accomplish. So, now we carefully

Fitting BI Tools to Users

One size does not fit all when it comes to BI tools. Organizations should segment users into categories based on their analytical habits and requirements. Most organizations have four to eight distinct categories of BI users. Once these profiles are known, organizations can then assign the right BI tool or solution to each type of user.

Illustration 7 provides a sample framework for mapping users to BI tools. The framework divides all users into two categories: (1) information producers, who create reports and views for others, and (2) information consumers, who consume those reports and views.

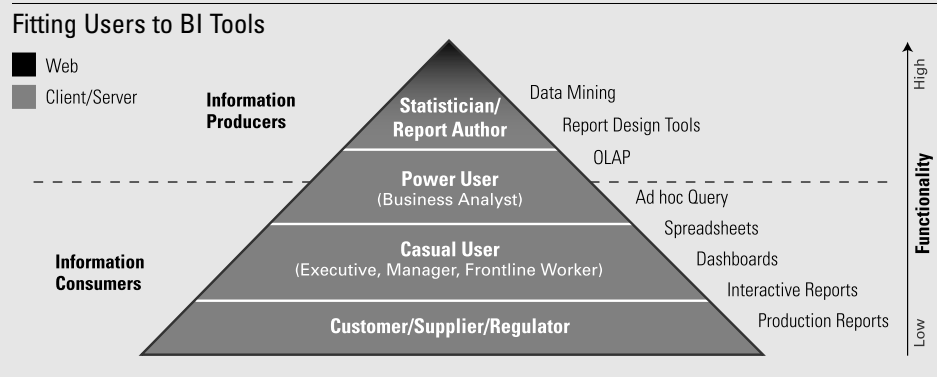


Illustration 7. This diagram illustrates one way to segment users and associate various types of BI tools with each user category.

classify how users interact with information and match new and existing tools to these modes of use,” says Sykes. (See “Fitting BI Tools to Users.”)

8. Leverage Dashboards and Scorecards. For a majority of users—those who view and interact with reports on a regular basis but not intensively—Web-based dashboards are the “new face of BI,” a perfect medium for delivering information in a way that matches most users’ requirements.

Dashboards offer an intuitive, multi-layered interface that delivers customized views of information and structures navigation into detailed data so users don’t get lost or waste time searching for the right report. The top level displays exception conditions using graphical indicators that alert users to issues they need to explore. The second layer provides analytical functionality that lets users slice and dice data to explore issues in a guided fashion. The final layer consists of detailed data and reports. In essence, dashboards provide built-in, guided analysis customized to individual users or their roles.

“We have 500 detailed reports that contain 85 percent of all the information people might want. However, we discovered that many users couldn’t find the right report and got frustrated. We now use dashboards that provide multiple layers of summarized information on top of reports. This creates a pyramid in which users access information at the top and gradually work their way down into the detail,” says Michael Masciandaro, director of business intelligence at Rohm and Haas, a specialty materials and chemicals manufacturer.

**Web-based Dashboards
Are the “New Face of
Business Intelligence”**

- **Information Producers**

Information producers generally comprise 20 percent of the total user population and have traditionally used desktop tools to create reports or models. Information producers consist of statisticians, who use data mining tools, and report authors, who use report design or programming tools to create custom reports. Report authors can be IT developers or “power” users—business users who understand the data and are computer literate. Since power users both create and consume reports, they straddle the line between information producers and information consumers. They typically use spreadsheets and query and reporting tools to access and analyze data.

- **Information Consumers**

Most information consumers are “casual” users who regularly view reports for decision making but don’t crunch numbers or perform detailed analysis on a daily basis. Casual users include executives, managers, staff, and external users. This is a large group that is well served by dashboards with guided analysis, interactive reports (e.g., OLAP, parameterized, linked, or searchable) and standard management reports. Most of these tools now provide a Web interface to promote ubiquitous access and ease of use and minimize administration and overhead.

- **Roles, Not Individuals**

Most users don’t fit neatly into any one category. An executive might want to view financial information using static reports published weekly, but view operational data in real time using a performance dashboard. Thus, it’s critical to govern information that users access and the BI functionality they use by their roles.

9. Develop Functionality and Reports Rapidly. Users often abandon BI tools if they don't see their requirements for new functionality or reports delivered in a reasonable time frame. To address this problem, many organizations create networks of "super users" to create reports for users in their workgroups or departments and give them new codeless development tools, which TDWI calls analytic development environments (ADE),⁵ to accelerate the creation of custom reports and applications. ADEs make it easy for developers or power users to create custom reports or solutions in a matter of hours or days, depending on the complexity of user requirements and the availability and condition of the data.

Networks of Super Users Create Reports for Their Colleagues

The super users not only create reports for their colleagues, but also provide training and first-line support. In turn, the IT department trains and supports the super users on the new tools and serves as a secondary help desk. The IT department creates business views or metadata layers that allow these users to create reports without having to understand SQL or the physical database schema. These formalized networks of super users ensure that BI tools stay in the hands of business users and keep IT out of the business of creating custom or ad hoc reports.

Turning over ad hoc report creation to departments also seeds the enterprise with innovative techniques that the IT department can disseminate to the rest of the organization. For instance, the technology group at Dow Chemical is monitoring departmental efforts to build custom dashboards to see what techniques are transferable to the enterprise. "The trick is to capture the creativity and flexibility at the departmental level and then scale up the solution for use elsewhere," says Gregg Reitz, supply chain BI product manager for the company. Dow Chemical was an early adopter of enterprise BI and standardization, having successfully standardized on its BI platform in the early 1990s and implemented its solutions globally.

Users Want to Query Information at the Speed of Thought

10. Deliver Fast Response Time. Most users are impatient. They won't wait long to obtain reports or get query results. Ideally, they want to query information at the speed of thought; in other words, instantaneous response time. BI administrators need to tune databases and leverage caches to ensure reasonable response times. They also need to educate users about the nature of the data they are querying. For example, users who request a custom report containing large amounts of detailed data can expect to wait much longer than they would for navigating hierarchies in a standard report.

"We set up processes to keep performance within bounds," says Bikram Kalra, manager of decision support at NBC Universal. "We only let power users create ad hoc reports, and we develop standard reports that everyone else uses. These reports contain prompts, so one report now replaces dozens of older custom reports. And we cache the top-level reports to provide fast response times, but drill-downs are dynamic."

Michael Masciandaro at Rohm and Haas, which has standardized on a Web-based BI tool for the majority of its 3,500 BI users, says, "It's hard to get users to use the tool if they don't get instant gratification; they lose patience and leave. Our goal is to have every click [get a response in] five seconds or less. A high percentage of responses are faster, usually less than a second, because we cache data sets and reports."

11. Deliver Right-Time Data. You can get the majority of users to endorse a BI solution if it delivers timely information that enables them to make better, faster, and smarter decisions and fix

⁵ Wayne Eckerson, *Development Techniques for Creating Analytic Applications*, TDWI Report Series, May 2005. www.tdwi.org/research/reportseries

problems before they escalate into red ink on the corporate income statement. Consequently, most organizations are now moving to update their data warehouses daily, if not more frequently, to deliver actionable information to users. Right-time data delivers actionable information to users when they need it, usually on an intraday basis.⁶

For example, Rohm and Haas moved from monthly updates of its data warehouse to daily and sometimes hourly updates after it standardized on packaged software from a single vendor for both operational and analytic applications. Besides providing business users with actionable information, this has enabled the company to shrink the time it takes to close its month-end financial books from 10 days to two days. It accomplishes the rapid updates by using packaged content, more efficient ETL processes, and changed data capture techniques.

12. Monitor Usage. The best way to judge the effectiveness of a BI environment and training programs is to monitor usage. Some companies view usage statistics as an early warning system for problems.

For example, International Truck and Engine Corporation tracks BI usage during the test phase of a new BI report or set of functionality. “If only three people out of 10 are using the system, then we meet with the other seven to find out the problems they have with it and make changes before we roll out the release,” says Jim Rappé, group leader of enterprise data warehousing at the company.

Rappé’s group tracks usage statistics so closely that it now knows what the uptake rate should be after issuing a new release of the software. If adoption rates are lower than normal, the team jumps into action. “If usage is below the norm, we book a 30-minute presentation during a departmental meeting to provide additional education and answer questions. We try to be proactive,” says Rappé.

13. Continuous Iteration. It’s one thing to manage a BI project that is delivered on time and within budget and meets user requirements. It’s an entirely different thing to sustain an initial success over the long haul. To do this, it’s critical to maintain close relationships with end users, continuously gather requirements, and deliver new iterations on a regular basis.

Many BI managers who have successfully steered a project to completion change roles and become in effect BI evangelists, who sell and market the value of the resource and continually gather new requirements for future releases.⁷ Some organizations hire account managers whose primary job is to serve as liaison with business users in a division or unit to identify how the BI resource can be leveraged or enhanced to meet existing or emerging business goals and strategies.

Summary. There are doubtless many other best practices when it comes to delivering an enterprise BI solution. The key is to remember that BI is not just a set of query and reporting tools; it’s an entire information management and delivery environment. Although considerable technical work is required to deliver an enterprise BI solution, the business must:

- Provide leadership for the initiative
- Take responsibility for standardizing data elements and changing processes that improve data quality
- Devise a road map that aligns BI efforts with overall strategic objectives and delivers the most value to the broadest range of users within the organization

Some Companies View Usage Statistics as an Early Warning System

It’s One Thing to Build a BI Solution; It’s Another Thing to Sustain Success over the Long Haul

⁶ Colin White, *Building The Real-Time Enterprise*, TDWI Report Series, November 2003. www.tdwi.org/research/reportseries

⁷ Wayne Eckerson, “The BI Evangelist,” *TDWI’s Case Studies and Solutions*, June 2004. www.tdwi.org/publications/newsletters

Standardizing BI Tools

The Proliferation of BI Tools

The hardest part of delivering an enterprise BI solution is integrating diverse sets of data into clean, consistent information that users can query and analyze. Without clean, consistent, and timely data, BI tools are not much good. “If you don’t get these fundamental things right, your BI standardization will still fail,” says one professional whose BI efforts have improved the company’s ability to control costs, focus on strategic customers, and increase profit.

Nonetheless, BI tools get the lion’s share of attention because most users think BI tools are the solution. They don’t see or understand the back-end data infrastructure upon which the BI tools rely. They don’t realize that BI tools are simply the window into the data infrastructure, not the entire solution in themselves. At the same time, BI tools are critical to the success of a BI solution. Without BI tools that are fast and easy to use, and conform to the way employees want to access and analyze information, the BI solution won’t succeed.

Rapid Technological Change. Part of the challenge in standardizing BI tools is that the technology has changed dramatically during the past decade, rapidly making formerly state-of-the-art BI tools obsolete. Organizations that desire to optimize the BI experience for users end up purchasing diverse sets of tools, while those who shun the latest and greatest technologies find their BI implementations hopelessly outdated and in need of a costly overhaul.

Since 1990, BI tools have evolved in three major directions:

- **Architecturally.** BI tools have evolved across platforms. Starting with mainframes and minicomputers, BI tools have been ported to desktop and client/server platforms, and most recently, to the Web, which offers centralized administration and a ubiquitous interface that is intuitive and requires little training to use.
- **Horizontally.** BI tools have evolved from individual tools geared to specific types of analytical users (analysts, developers, managers, casual users, etc.) to BI platforms containing suites of tools (integrated query, reporting, and analysis) that are customizable to any type of user. The challenge for vendors is to truly integrate various BI tools, many of which were purchased through acquisitions or developed using now-obsolete technologies. Vendors that adopt service-oriented architectures and Web services as internal standards for development are building the basis for a truly integrated and extensible BI environment.
- **Vertically.** Leading BI players are integrating the BI “stack” by supplementing BI suites with data integration tools (i.e., extract, transform, and load [ETL] tools; enterprise information integration [EII]; and enterprise application integration [EAI]) to supply the raw material and with graphical development workbenches and packaged analytic applications to create the finished product (i.e., applications).

With each evolutionary wave, different groups in every organization have purchased new BI tools and products, creating a mishmash of BI functionality and vendor loyalties. BI standardization attempts to bring order to the willy-nilly dissemination of BI capabilities within organizations by replacing multiple, overlapping BI tools with a standard BI platform. However, there is a creative tension to establishing standards, since the market continually delivers new innovative solutions.

BI Tools Are Simply the Window into the Data Infrastructure, Not the Entire Solution

BI Standardization Attempts to Bring Order to the Dissemination of BI Capabilities in Organizations

Organizations must be vigilant about reviewing their standards and assessing whether they still make sense in light of technological advances.

Causes of Proliferation. Another valid cause of BI tool proliferation is that different types of users require different BI tools, which we addressed earlier in this report. A majority of survey respondents (54 percent) cite this as a major reason why they have multiple BI tools. However, other causes appear to be more problematic. Autonomy of departments to buy their own BI solutions (42 percent), lack of functionality in a single vendor toolset (41 percent), packaged applications that came with BI tools embedded in them (31 percent), and mergers and acquisitions (22 percent) all contribute to the unnecessarily high number of tools within organizations. (See Illustration 8.)

Why Does Your Organization Have BI Tools from Multiple Vendors?

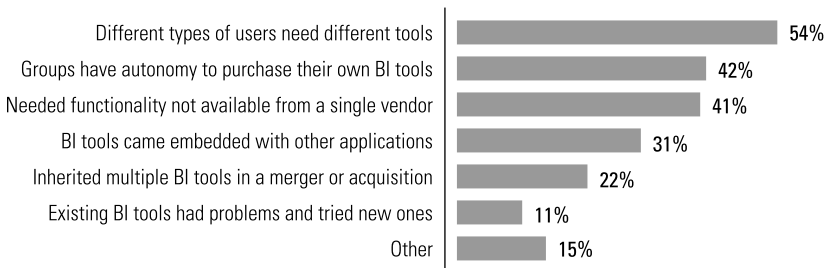


Illustration 8. Based on 594 respondents.

Many organizations are afflicted by decentralized organizational structures, which are designed to empower local groups to move quickly to meet local market needs and requirements. However, from an internal perspective, local autonomy leads to enterprise chaos.

Our survey respondents indicated that many individuals and groups outside of corporate headquarters are authorized to purchase BI tools. Specifically, business units were cited by 50 percent of respondents, departments by 35 percent, business analysts by 22 percent, and workgroups by 13 percent. With so many groups and individuals empowered to purchase BI tools, it's no wonder organizations struggle to create and enforce a standard selection. (See Illustration 9.)

Which Groups or Individuals Are Empowered to Purchase BI Tools?

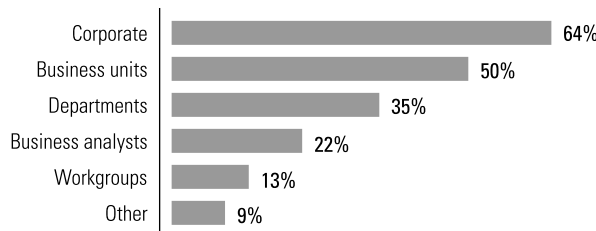


Illustration 9. Many groups outside of corporate headquarters are empowered to purchase BI tools, which is a major factor in the proliferation of BI tools. Based on 594 respondents.

**One Company Found
15,000 Microsoft Access
Databases and 850,000
Excel Spreadsheets on
Corporate Servers**

Spreadmart Disease. An enterprise data architect at a Midwest manufacturing company, who asked not to be named, says his executives decided to mandate the use of standard BI technologies and processes because they never knew the true state of the business. “Managers became adept at hedging the numbers within Excel spreadsheets, and executives got tired of all the hedges and just wanted the real numbers.”

The manufacturing company is now attempting to establish a standard BI architecture across the company’s multiple divisions, which operate fairly autonomously. Currently, many users use Excel and Access for information analysis. The enterprise data architect estimates that the company has almost one million spreadmarts. It did a scan and found 15,000 Microsoft Access databases and 850,000 Excel spreadsheets residing on corporate servers.

“We hope these spreadmarts will die on the vine as we bring new tools and data online. Our rogue [report] developers will come to appreciate the simplicity of [the new BI tool]. It also helps that some business executives say they are going to remove Access from every user’s desktop once the new BI system is deployed, and that they’ll be able to run the same reports as anyone else, which serves as a kind of audit check,” says the architect.

Not Invented Here. A major telecommunications company had a very successful enterprise BI deployment, with a formalized BI competency center and a signature for reports that were “CFO certified.” Unfortunately, it merged with another company that lacked such standards and strong business-BI partnership. The result: one department selected another BI vendor for a new application. The department did not follow a selection process or take the time to evaluate whether any existing standards could meet its needs. “Users will take the path of least resistance. The attitude is, if you’re not going to help me, I’m doing it myself. IT has to help people do their jobs,” said a BI developer from the data warehouse team.

Drivers of Standardization. There are two main reasons why organizations are intent on standardizing their use of BI tools and delivering an enterprise solution: costs and information consistency. Other, less pressing factors include the desire to better integrate transactions and analytics, support an expanding user base, and reduce the number of suppliers. (See Illustration 10.)

Drivers of BI Standardization

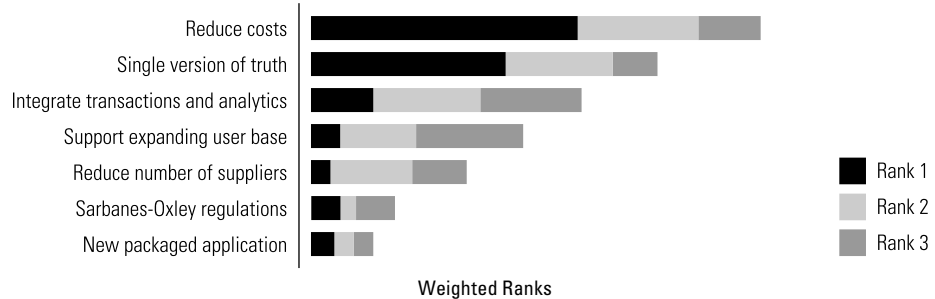


Illustration 10. Based on 594 respondents who were asked to rank the top three drivers of their BI standardization effort.

Costs. The overhead costs of supporting multiple BI tools add up quickly. Organizations must pay software licenses and annual maintenance fees for each BI product they own. In addition, many

BI tools require dedicated servers, separate security approaches, and proprietary metadata, thus increasing hardware, operating system, and administration costs. End-user training and support costs climb with each additional BI product. Organizations must assign and train different technical experts to configure each BI tool and develop custom reports.

Consistent Information. But costs are only part of the desire to standardize. Without a common BI toolset, it is very difficult to deliver consistent reports and information. Invariably, groups using different BI tools create overlapping reports with different calculations and formats. Even if the reports run against the same data warehouse, the information they contain will not be consistent.

Given the strategic and tactical costs of multiple BI tools, chief financial officers and BI executives are now working closely together to reduce the burden of supporting multiple toolsets. According to TDWI research, almost one-quarter of respondents (24 percent) have already standardized a single set or small number of BI tools, whether from one or multiple vendors. Almost one-third (32 percent) plan to standardize toolsets within two years, and another 22 percent plan to do so gradually over many years. A minority (22 percent) have no plans to standardize their BI tools. (See Illustration 11.)

When Will Your Organization Standardize on a Single Set of BI Tools?

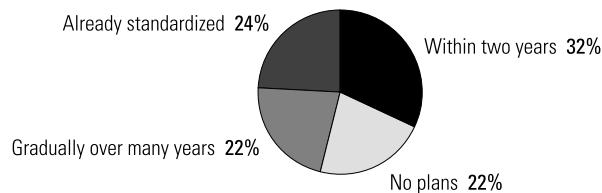


Illustration 11. A third of organizations plan to standardize on single set of BI tools within two years. Based on 594 respondents.

Patience Is Key. Most large organizations are in no rush to standardize BI tools. They realize it takes a long time to undo years of neglect, change long-ingrained habits, and convert users to new BI tools. “We chip away at the old applications,” says Russ Vaughn, former senior vice president of data warehousing at Bank of America.

Selecting Enterprise BI Tools

One of the first steps in standardizing on enterprise BI tools is to select a product upon which to standardize. This is not as easy as it may sound.

The requirements for an enterprise BI platform are more stringent and comprehensive than departmental BI implementations, which serve a homogeneous user population. If you boil down the hundreds of requirements that fill the current crop of requests for proposal (RFPs) for BI standardization projects, organizations are looking for breadth, depth, and scalability in a BI platform. Breadth means, “Does it support the diversity of users, from casual report consumers to sophisticated report authors?” Depth means, “Does it support the features and functionality required to meet user requirements in each category?” Scalability means, “Does it scale up to support thousands of users with adequate response times for both ad hoc and scheduled queries?” (See “How To Select BI Tools” on page 26.)

Requirements for an Enterprise BI Platform Are More Stringent Than Departmental Solutions

How to Select BI Tools

The best way to select an enterprise BI tool is to follow a methodology and involve the right people at various phases along the way. Trying to bypass the process rarely works. Since the organization is investing considerable sums of money in license fees, maintenance, servers, training, support, and administration, it's wise to do a careful evaluation. On the other hand, don't succumb to analysis paralysis. The leading BI players offer reasonably mature tools that will likely meet most of your needs.

1. Form a BI selection committee. The selection committee should comprise a cross section of stakeholders from different functional areas and user segments. This includes IT report developers, data warehouse modelers, power users, and secondary business users. This group should have one or more executive-level business sponsors who can provide direction regarding overall business strategy, process, and information requirements.

Current BI application owners are prime candidates for serving on the core selection committee, as they have unique insights on current successes and unmet needs. Giving them ownership in the selection process minimizes the risk of their second-guessing you later. At the same time, keep the selection committee small enough to be effective. The selection committee will elicit feedback from a larger user constituency to ensure buy-in.

2. Define target users and usage scenarios. Many organizations still do a poor job of incorporating user profiles into deliverables. Their focus is too much on creating a data mart or a report, rather than on defining what information is required by what role and level of people in the organization. Figure out who will interact with that report and how; different types of users require different tools or interfaces. Understanding these user segments is critical in managing the scope of the selection and resolving conflicting requirements. Following this process, you may determine that a distinct user group has such unique requirements that it demands a different solution.

3. Refine information requirements. Every BI tool handles data and schemas slightly differently. Thus, it's critical to incorporate information requirements into your BI selection process, which means defining ways in which users analyze information. For example, users may need to view sales with inventory to calculate "days sales inventory" by various product groupings and time periods. This single requirement translates into a host of technical features, such as: 1) multi-pass SQL to query the two fact tables in a data warehouse; 2) semi-additive measures to aggregate inventory across product groupings, but not across time periods;⁸ 3) automatic aggregation of individual rows of data to view totals for the year or product group. Most BI tools handle these requirements in drastically different ways. Some will leverage the database, others the BI application server, and still others the desktop. The selection committee must understand these differences and know which approach best serves the organization.

4. Define and rank selection criteria. The various methods of capturing user requirements include individual user interviews, gap analysis, and brainstorming sessions. The key, however, is to translate a requirement into a BI tool capability. For example, users rarely say, "We want a BI tool with a metadata layer." However, they may say they want to create their own reports without having to know SQL.

Major categories of selection criteria include: vendor viability, vendor strategy, query, reporting, analysis, information delivery, spreadsheet integration, dashboards, administration,

⁸ Cindi Howson, "MOLAP and DOLAP: Apples and Oranges," *TDWI FlashPoint*, July 2002. www.tdwi.org/publications/newsletters

architecture, cost, training, and support. Prioritize each criterion and assign weights. Check www.BIScorecard.com for sample criteria checklists.

5. Requests for information (RFI). RFIs create a lot of work for the vendor and not much value for the customer, since many vendors say “yes” to each requirement. To be fair, some vendors are more honest than others, and requirements are subject to interpretation. However, there are requirements that may be show-stoppers that an RFI can weed out. For example, if your technical architecture requires Unix, vendors that don’t support Unix can be eliminated from consideration.

To improve the value of an RFI, define the requirements that will be decisive in your selection or standardization. Ask for specific product names, feature names, and explanations for how the product line fulfills key user requirements. Open-ended questions can shed significant light on a vendor’s approach and level of interest in your project. Vendors that provide carefully thought-out responses instead of prepackaged marketing material are worth a closer look.

6. Scripted demos. Vendor demos should be scripted so your committee members can compare them objectively. Prepare a consistent agenda for each vendor to follow. In the agenda, allow time for a discussion of strategic considerations as well as specific product capabilities. Be sure to invite an extended user base to the demos so you can elicit qualitative feedback and ensure users have a stake in the decision-making process. Ask users to score the vendors on their ability to meet your specified requirements.

Scripted demos can be based either on the vendor’s sample data or on your own. Using company data can help raise the understanding of how each vendor’s tool is different, yet it requires a large investment from both you and the vendor. Such an investment may be worthwhile with a handful of vendors if you have already diligently shortened your list (see proof of concept, step 8), but is impractical with many vendors.

7. Determine best fit. Using the requirements matrix defined in step 4, score the RFI responses and demo feedback. Incorporate strategic considerations, qualitative research, and customer feedback to determine which vendor(s) most closely match(es) your company’s short- and long-term BI needs. If you have one clear leader, do not fully dismiss the runners-up. You may find out during the proof of concept, contract negotiations, or pilot that your first choice has insurmountable issues.

8. Proof of concept. You may have only one or two vendors that move onto the proof of concept stage. This is your chance to test the tool in your environment. It is only a test, though. At this point, it’s important to keep the selection committee focused on the critical requirements rather than endlessly playing with the software or attempting to create usable reports. The proof of concept is a throwaway: its sole purpose is to confirm that the product works as you expect it to.

Be sure to score the vendor(s) on each of the key requirements defined in step 4. Carefully manage the scope to use one subject area and a handful of sample reports for the proof of concept. The sample reports should be based on information requirements defined in step 3 and be moderately complex (that is, not simple list reports that all BI tools can handle, nor killer reports that would take your best programmer a full month to create). The proof of concept will give you insight into how you may need to adapt the rest of your BI architecture, but it is not the point at which you solve all the implementation problems.

RFIs: Open-Ended Questions Shed Light on Vendor Approaches and Interest in Your Project

Today's BI Suites Cover the Range of User Requirements

Fortunately, leading BI tool vendors have made great strides in the past three years in rounding out their BI portfolios. Today's BI suites cover the range of user requirements, from interactive dimensional analysis to pixel-perfect report authoring. However, many vendors are still struggling with the scalability issue. Most BI tools started out as desktop Windows products and still stumble in delivering a bulletproof, server-centric architecture that can rightfully claim a spot in a legitimate corporate data center. In addition to breadth of solution, an enterprise BI platform demands a scalable architecture and enterprise-class administrative tools.

Scalability. There are some telltale signs of scalability in a BI product. For instance, you should evaluate the way it queues requests; leverages clusters, memory, caching, and unique database functions; and monitors system performance. It should provide query, reporting, broadcasting, metadata, and other capabilities as services that can be called from any application or service and replicated to increase workload throughput. However, the only true way to determine scalability is to test the toolset with your own data and reports, simulating your desired usage (push/pull, interactive/static) in a proof of concept. Some vendors may balk at doing this, because it's expensive, but it's your only prevention against your multimillion dollar investment never getting off the ground.

Many BI Tools Started Out as Departmental Solutions and Lack Enterprise-Class Administrative Tools

Administration. In addition, since many BI tools started out as departmental solutions, most continue to lack a comprehensive set of enterprise-class administrative tools. The ability to monitor usage at a granular level is often only available from third-party vendors. Change management and versioning are lacking, as well as tight integration with third-party security systems and a single runtime metadata repository for the entire BI platform. Facilities to migrate interdependent objects from development to test to production are often nonexistent, or manual at best. While most leading BI vendors have made great strides in these areas, there is still much room for improvement.

Design. In addition, many tools lack a consistent set of design tools to create BI solutions for any type of user. Most design tools, if they exist at all, apply to a single BI tool instead of the entire suite, or require highly skilled developers to work with low-level application programming interfaces (APIs).

However, some BI vendors are starting to provide analytic development environments. ADEs run on a robust BI platform and make it easy for developers to incorporate a variety of BI functionality—ad hoc queries, prompted reports, dimensional analysis, dashboards, broadcasting, collaboration, and so on—into a diversity of robust applications and solutions. Consequently, ADEs will provide high ROI and become a key tool for delivering BI to the enterprise.

Best of Breed versus Suites. Although no single BI tool can meet the needs of all users in an organization, it is possible to standardize on a set of enterprise BI tools, one tool for each category. And while it was impossible to find a comprehensive set of BI tools from a single vendor three years ago, some leading vendors now offer BI platforms that support a comprehensive suite of BI tools. (See “Standardizing on Categories of BI Tools” on page 9.)

Our survey data shows that a slight majority of organizations still purchase best-of-breed products from multiple vendors (55 percent), but the percentage purchasing an integrated suite from a single vendor is not far behind (46 percent). So, it's clear that single-vendor BI suites are gaining in popularity versus the best-of-breed approach. This makes sense, since BI suites enable organizations to consolidate the number of suppliers they deal with, and with many vendors focusing on integrating underlying architectures, BI suites hold the promise of lower cost of ownership. Of course, the trade-off is that users may not always get exactly the functionality they desire in every case. (See Illustration 12.)

Where Do You Obtain Your BI Tools?

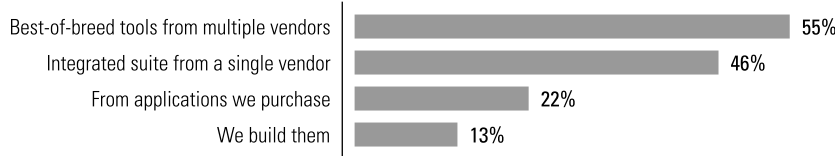


Illustration 12. The percentage of organizations purchasing integrated BI suites is not far behind those choosing a best-of-breed strategy. Based on 594 respondents.

Although we have no historical data to prove it, we believe the percentage of organizations purchasing integrated suites is rising fast. This is partially because integrated suites have not existed for very long, and partially because the suites are closing the gap in functionality with best-of-breed tools.

In addition, whenever competing vendors do business with the same organization, the vendors attempt to expand their footprints. A commercial real estate company recently selected a planning tool from a different vendor than its reporting tool. “The [planning] vendor was hoping to get a toehold by throwing in the rest of their BI suite. Our finance users are now challenging our reporting standard,” says the BI manager.

Building BI. Organizations that build BI tools use frameworks like Microsoft .NET to create reusable query and reporting components. For instance, a Boston-based financial services firm built a dashboard for corporate finance users from .NET components. The company has eight .NET components that it reuses when extending the dashboard with new data, views, or functionality. These reusable components offer accelerated development, especially compared to their previous BI tools, which required creating new reports from scratch each time a user requested the data in slightly different views.

Evaluation Criteria. When selecting BI tools, organizations need to marry strategic and technical criteria. One approach is to let the IT department narrow down the list of BI tools that meet technical requirements and fit within the company’s technical architecture. Then, a committee that represents a cross-section of current and future users of the BI tool should evaluate the finalists and select the vendor most aligned with their needs.

When Selecting BI Tools, Organizations Need to Marry Strategic and Technical Criteria

According to survey respondents, there are many important strategic criteria. They include: total cost of ownership (67 percent), quality of vendor support (61 percent), pricing (52 percent), vendor viability and leadership (52 percent), and legacy investments in existing tools (51 percent). (See Illustration 13.)

Strategic Criteria for Selecting Enterprise BI Tools

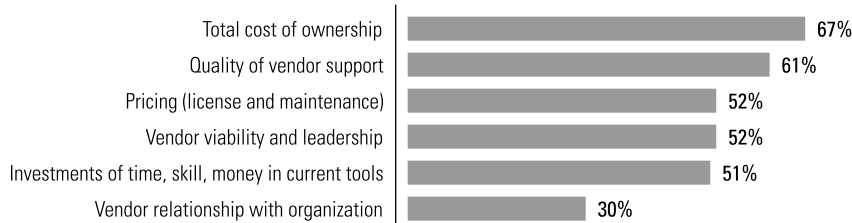


Illustration 13. Based on 490 respondents who rated the above criteria as “highly important” and whose organizations are trying to transform BI from a departmental to an enterprise resource.

Technical Criteria. There is a range of technical criteria that organizations need to consider. Most important is meeting user requirements, selected by 83 percent of respondents. (See Illustration 14.) This is why involving users in any selection process is key. In addition, a majority of respondents selected a half-dozen other critical requirements. These include Web delivery (75 percent), data scalability (i.e., the ability to query large volumes of data) (72 percent), response time performance (69 percent), user scalability (68 percent), and integration with existing applications (54 percent).

Technical Criteria for Selecting Enterprise BI Tools

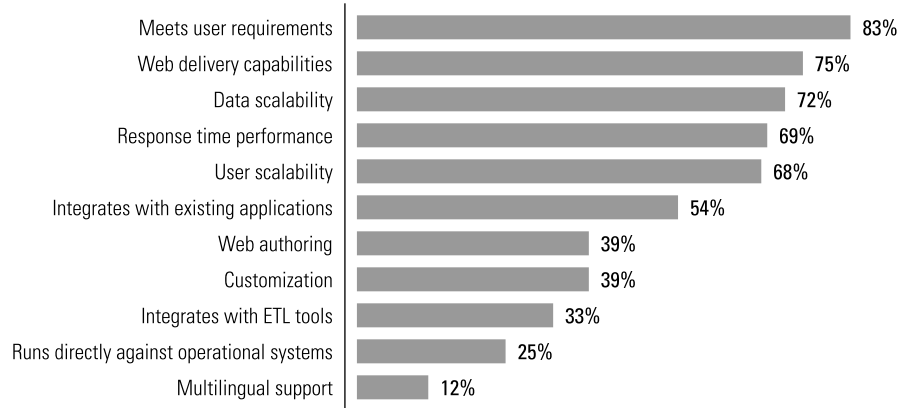


Illustration 14. Based on 490 respondents who rated the above criteria as “highly important” and whose organizations are trying to transform BI from a departmental to an enterprise resource.

Summary. It’s critical to select the right BI tools if your organization wants to transform BI from a departmental initiative to an enterprise one. Make sure you marry organizational and technical requirements and follow a selection process, so you make a wise choice based on a broad view of the organization and its needs.

Challenges to Standardizing on Enterprise BI Tools

There are many challenges involved in migrating to a standard BI toolset. Before your organization launches headlong into a BI standardization project, it should understand the potential problems and pitfalls that often afflict such endeavors. There are numerous technical, political, and cultural problems that lie hidden behind a rosy cost-benefit analysis and may cause organizations to rethink their strategy for sweeping their BI environment clean.

A BI Standardization Effort Can Also Backfire in Many Ways

A BI standardization effort can also backfire in many ways. How do you select one platform out of many currently in use within your organization? How do you avoid political and cultural battles that can cost more to resolve than the BI standardization effort will save? How can you be sure the new BI platform will scale up to support all users and scale out to support their diverse sets of analytical needs? In most cases, the answer is to tread carefully, plan thoroughly, and go slowly.

According to the TDWI survey, the top challenges for standardization efforts are individual resistance to change (48 percent), followed by departmental autonomy (43 percent), high switching costs (28 percent), and training and support costs (26 percent). (See Illustration 15.)

Standardization Challenges

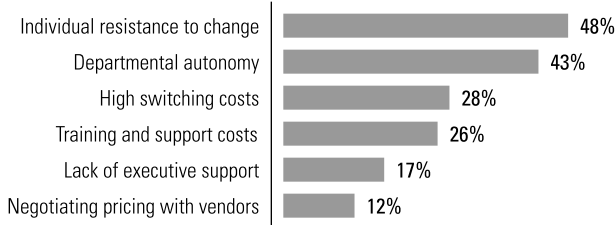


Illustration 15. Individual resistance to change is the biggest obstacle. Based on 460 respondents.

Politics. The biggest challenge in any BI standardization project is internal resistance to change—that is, politics. The nastiest battles occur after a merger or acquisition when two firms have large, dissimilar BI environments. Users and administrators who have become attached to a BI tool or environment will fight to the last to protect their investments and preferred methods of viewing and distributing information. Choosing one environment over another is a political nightmare.

Similar tension exists when a corporate architecture group establishes enterprise standards and tries to force them on business unit leaders and managers accustomed to developing their own systems. “Everyone wants to be in the driver’s seat and no one wants to be driven,” says Boeing’s Harvey Kriloff, who is part of the company’s BI center of excellence (which tries to define standard BI technologies for corporate use, among other things). “Many business managers resist implementing corporate standards because they think it will slow down their process and usurp their authority. So, it’s critical that you get upper management to buy in to the process.”

Partnership Problems. Kriloff says the trend toward outsourcing and partnering for key business processes exacerbates the problem. “We do plenty of work with the federal government that requires its contractors to use specific tools, which often run counter to our established standards. In addition, we may work with third-party design shops or other contractors in Moscow, Italy, or Australia, and getting them to buy into a technology is difficult for cultural reasons. It’s also just plain hard to train and support all of our far-flung offices. As a result, they implement the tools with which they feel most comfortable.”

Kriloff adds, “A lot of [partners] say, ‘We’re cheaper because we use this [non-standard] tool.’ We say, ‘Yes, it’s cheaper in the short run, but in the long run it may not be.’ At the very least, we require groups to generate metadata so we can logically integrate the tools into our architecture and perform impact analysis to manage the environment efficiently.”

Culture. On a smaller scale, most users would rather not change the way they access, view, and analyze information. It takes extra time and effort to learn new tools and become familiar with new reports and data. Users have no patience for relearning new ways of doing things that seem to add little value.

To minimize the impact of such changes on end users, NBC Universal created new reports to look and feel like its previous custom-based Windows ASP reports, says Bikram Kalra, manager of decision support. “Formatting was really important to our users, so we provided the same look and feel as the old reports but added new features and improved the data they were accessing. We also augmented the data in our data warehouse to include the data users kept in Excel.” In essence, NBC Universal created a bridge so users could cross over from the old environment to the new.

The Biggest Challenge in Any BI Standardization Project Is Internal Resistance to Change

NBC Universal Created a Bridge for Users to Cross Over from the Old Environment to the New

In addition, many users fear change. They fear they won't be as effective with the new tools or techniques as with the old ones; they worry that the information they rely on will disappear, undermining their effectiveness and reputation; or they fear they will lose "control" of the information and not be able to spin the results in a favorable light. Before you can move forward with a BI standardization effort, you need to assess these fears—rational or not—and develop plans to allay them.

Technology. Outside of the social infrastructure, there may be insurmountable technical constraints as well. Some remote offices may use slow dial-up lines, making ad hoc analysis via the Web impossible. Security concerns may limit the use of downloadable Java applets or other "thick" Web client alternatives. Also, many BI tools scale differently, and deploying them incorrectly can cause an implementation to fail, making it appear that a bad selection was made.

An Enterprise BI License Costs up to \$700,000 for 1,000 Users, Not Including Training or Premium Support Services

Costs. Although maintaining multiple BI tools duplicates efforts and expenditures, swapping out BI tools in midstream is not cheap, either! First, you need to purchase an enterprise BI license, which costs up to \$700,000 for 1,000 users, not including training or premium support services. Plus, most vendors charge about 20 percent a year in maintenance fees to obtain product upgrades and basic support.⁹

In addition, you will need to retrain users and administrators, who have been using other BI tools, to rewrite existing reports in the new tool. These "retooling" expenses can be so high that many organizations "grandfather" existing BI tools by enforcing the BI standard only in new projects.

Interruption of Business Processes. Changing a BI tool may involve changing, or at least disrupting, an existing business process. Problems arise if a new BI tool doesn't support the same types of analytical calculations, output formats, delivery channels, and external logic used in the existing application. If that's the case, the organization will need to decide whether to customize the tool or reengineer the business process, neither of which is inexpensive or quick. These types of applications are also excellent candidates to be grandfathered.

New Tools Threaten Careers. Many IT and power users develop skills and expertise in BI tools. Eliminating these tools threatens their career path, job security, and reputation within the firm. Undoubtedly, many of these individuals will vigorously resist the introduction of new BI tools, especially those who spend significant time collecting and formatting data in spreadsheets. Alternatively, new recruits may question a company's BI standard if their former employer used a different portfolio of tools.

"Originally, our business analysts were kind of gun-shy about adopting a new BI standard. They worried whether the new tool would do away with their jobs, and began pushing back during the user acceptance phase of the project. But I got the CEO involved and they all became very engaged with the project," says Interval's Sapana Patel.

It's best to get ahead of such defensive posturing by enlisting the technical literati to help you migrate to the new environment. A good strategy is to appeal to their desire to learn new technologies and solve technical problems. An "overtime" bonus for participating in the retooling effort also keeps morale headed in the right direction.

⁹ Based on figures in the TDWI course Evaluating BI Suites. Vendors estimated list prices for a 1,000-user scenario containing a mix of user interaction modes and tools for design and administration.

Usage Isn't Guaranteed. The hardest part about implementing BI tools is getting people to use them. Many will revert back to old ways of doing things, especially if the decision to migrate is largely political (e.g., after a merger or acquisition) and doesn't make their jobs any easier. Organizations need to aggressively market and sell the new BI environment, as well as provide requisite training through all possible channels.¹⁰ Of course, this costs money as well, which should be factored into the initial cost-benefit analysis. In the end, sometimes it's necessary to go cold turkey and shut off the old environments at a certain time after people migrate to the new platform.

Organizations Need to Market and Sell the New BI Environment and Provide Requisite Training

Strategies for Standardizing BI Tools

Given the difficulties associated with standardizing BI tools, most take a go-slow approach. "It has actually been harder to shut down a legacy BI tool than consolidate our independent data marts," says Dirk de Wilde of Canadian National Railway Company. "The tool drives hundreds of complex reports, not all of which are being used, but which would take us an immense amount of time to convert."

Most Companies Take a Go-Slow Approach to Standardizing BI Tools

To make progress toward enterprise BI, many organizations adopt different strategies based on the situation. Most firms grandfather existing BI tools, but with some exceptions: 23 percent remove support for the existing BI tools; 22 percent redirect the queries to a new data/metadata source; and 41 percent continue to support the tools but require new projects to adopt the standard. Only about a third aggressively mandate a cutover to new tools by a certain date. (See Illustration 16.)

Approaches to Standardizing BI Tools

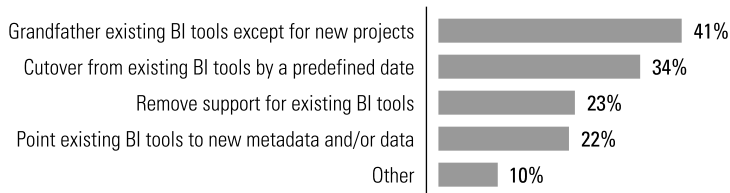


Illustration 16. Most organizations grandfather existing BI tools rather than replace them. Based on 594 respondents.

Inventory. To determine what approaches to use, organizations first must step back and inventory their existing environment to find out what tools exist and the applications and users they support.

This is how one transportation company, which asked not to be named, began its consolidation and standardization effort. It identified all BI applications and reports and the BI tools that supported them, as well as the numbers of active users each supported and the trouble tickets each generated. The company then prioritized its efforts and came up with several approaches to dealing with legacy applications and BI tools:

- Operational Reports.** The company discovered that some reports were more operational in nature and didn't belong in the BI environment. These were turned over to the administrators of various operational systems for re-hosting.

¹⁰Cindi Howson, "Want to Increase Usage of Your Data Warehouse? Market it!" *TDWI FlashPoint*, December 2002. www.tdwi.org/publications/newsletters

2. **Low-Hanging Fruit.** When an application didn't have many users or it generated a lot of trouble tickets, the team re-created the reports using the new BI tool, running against the re-architected corporate data warehouse.
3. **Politically Sensitive.** Many applications, however, had a strong base of users who were very reluctant to convert to a new BI tool or data structure if any of the legacy features or functionality would not be supported. The company won't force these users to convert until its standard BI tool offers equivalent functionality to the existing desktop tool, which will occur when it upgrades to the latest release of the BI tool.

Summoning Resources. The company's IT managers are patient, because many users have become attached to a "legacy" BI tool running against old staging tables in the organization's original data warehouse, which has since been re-architected to optimize performance and flexibility. The team also needs to re-create large numbers of existing reports in the new BI tool and retrain users, each of which takes considerable time and resources.

The Company Doesn't Want to Give Users Any Excuse Not to Adopt the New BI Toolset

The company also doesn't want to give users any excuse not to adopt the new BI toolset. First, they need time to set expectations about the data that users will see in the new reports, since the data comes from the re-architected data warehouse and may not match, dollar for dollar, the data in their legacy reports. The data will be cleaner and more accurate, but the IT managers know users may not automatically embrace it.

Migrate Data or Tools? In some cases, the team left the legacy data structures in place and pointed their new BI tool at them. "If the old data structures were acceptable from an architectural perspective and provided reasonable performance, we left them in place and migrated to the new tool," says a data warehousing architect for the company.

However, the reverse did not make sense, although the team explored whether to point the legacy BI tool to the new data warehouse. "We were on such an old version of the [legacy BI] tool that it would have cost as much to update the application with new data objects as it would have cost to cutover to a new tool. In addition, the legacy tool runs on the desktop and we wanted to make a clean break to the Web," says the data warehousing architect.

Master Data Management. One strategy that companies can employ to ease BI tool migration pains is to centralize the management and administration of dimensions and hierarchies (i.e., master data) that are common among existing BI applications, data warehouses, and transactional systems. In many ways, this is the first step that organizations should take when standardizing BI tools: get the data right and then follow by standardizing the delivery methods. This is the approach a financial services firm in Boston took when standardizing its BI environment.

"We have a metadata-driven tool that manages all the hierarchies across the firm, and we use that to drive all our reporting," says the director of BI, who also asked not to be named. "So reports for headcount, profit and loss, or assets all look and act the same way, using the same pick values and drill-downs."

Enforcement and Success

Success Rates. Given the challenges in standardizing on enterprise BI tools, it's not surprising that one-third of organizations consider their efforts “moderately” successful. However, a majority (58 percent) consider their efforts to introduce enterprise BI tools successful to a “high” or “very high” degree. (See Illustration 17.)

Of course, not everyone agrees on the definition of success. To some, success might be enforcing BI standards regardless of whether the tools get used broadly or deeply. To others, the value that end users derive from the BI environment in total—not just whether they like the BI tools—is the final arbiter of success.

“We try to standardize the criteria for judging a successful solution, since every group evaluates the effectiveness of their BI tools and processes differently,” says Boeing’s Kriloff. “There is a lot of folklore that passes as truth—like ‘We tried that [standard] BI tool and it doesn’t work,’ but in reality they may have used an earlier version of the tool or may not have implemented it correctly.”

To what degree has your BI standardization been successful?

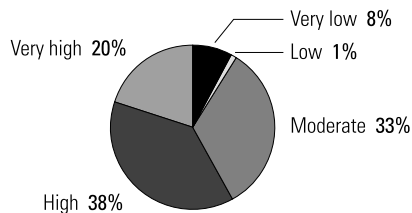


Illustration 17. Based on 141 respondents whose organizations have already standardized on a BI toolset.

ROI. A few companies rely on traditional return on investment metrics to evaluate BI success. This mirrors research for data warehousing and BI overall, which shows that most organizations implement BI for its strategic value, not bottom-line cost savings.

Only 9 percent of organizations have performed an ROI assessment of their BI standardization efforts. Thirty-eight percent plan never to estimate the ROI, while 35 percent plan to do so in the future, and 18 percent aren’t sure. (See Illustration 18.)

Have You Performed an ROI of Your Standardization Effort?

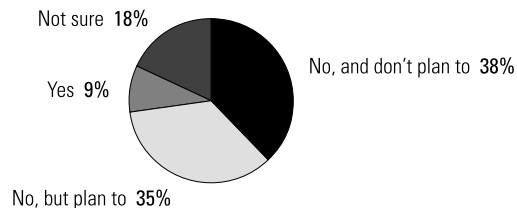


Illustration 18. Most companies either have yet to evaluate the ROI of their standardization effort, or don't plan to. Based on 460 respondents.

**Enterprise BI
Standardization Efforts
Average a Three-Year ROI
of 60% and Annual Cost
Savings of \$781,724**

The few organizations in our survey (43) that have calculated the ROI of their enterprise BI standardization effort average a three-year ROI of 60 percent and average annual cost savings of \$781,724. Compared to the rest of the qualified survey respondents, these organizations on average are bigger (in terms of revenues) and more likely to be trying to transform BI into an enterprise resource than other organizations. In short, these standardization efforts are large projects that require sizable up-front investments to create a standard BI and data platform, but also deliver sizable cost savings.

Conclusion

This report discussed the benefits and challenges of moving to an enterprise BI standard. Today, many organizations desire to provide all workers with BI tools that enable them to unlock the full potential of information to enhance their decisions, plans, and responsiveness to events.

**Web-based Dashboards
and Scorecards Are the
“New Face” of Business
Intelligence**

Conform to Users. The key to standardizing BI tools is to make them conform to the way users want to work, and not vice versa. First, this requires knowing your users—what information they need, how they like to receive it, and how much they want to interact with it. Interestingly, user requirements change based on what role they are playing at the moment. In one role, a user may require lots of information and unfettered access to explore data; and in another role, the user may simply need to review summary data on a weekly or monthly basis.

Second, organizations must fit BI tools to each user and the different roles they play. One size does not fit all. Different users require different BI tools, and often different modes within a single tool (author, navigator, recipient). Thus, to deploy BI to the enterprise, organizations must select BI tools that can be customized to users' requirements dynamically using security profiles. The tools must also support a Web-based environment and provide adequate scalability, performance, and extensibility to meet enterprise processing requirements.

BI Platforms. Most BI vendors have responded to these requirements by delivering BI platforms that consist of integrated suites of Web-based tools running on a common set of application services that can be customized to meet the information and analytical requirements of large numbers of individuals and groups. Because they run on scalable application servers, these BI platforms make it possible to finally deliver interactive reports and information to any user inside or outside the organization.

**The Day When BI
Becomes Invisible Is the
Day It Finally Succeeds**

Ironically, enterprise BI tools, if deployed properly, begin to fade into the background. Like the electrical grid that we can plug appliances into, we will soon expect the BI utility to deliver insight on demand in response to our queries. Using Web services and service-oriented architectures, our application developers will plug core applications into the BI utility and give users the critical information they need to manage the processes for which they are responsible on a day-to-day basis. The day that BI becomes invisible is the day it finally succeeds.



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BusinessObjects XI includes Crystal Reports®, the industry standard for enterprise reporting. Business Objects has also built the industry's strongest and most diverse partner community, with more than 3,000 partners worldwide. In addition, the company offers consulting and education services to help customers effectively deploy their BI projects.



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Cognos is the world leader in BI and performance planning software for the enterprise. Its solutions let companies improve and direct corporate performance by enabling all of the key steps in the management cycle—from planning and budgeting, to measuring and monitoring performance, to reporting and analysis. Cognos is the only company to support all of these key management activities with a complete solution that spans all of the essential components of corporate performance management—enterprise planning, scorecarding, and BI.



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Hyperion is the global leader in business performance management (BPM) software. More than 10,000 customers—including 91 of the *Fortune* 100—rely on Hyperion software to translate strategies into plans, monitor execution, and provide insight to improve financial and operational performance. Hyperion combines the most complete set of interoperable applications with the leading BI platform to support and create BPM solutions. A network of more than 600 partners provides the company's innovative and specialized solutions and services. Hyperion is traded under the Nasdaq symbol HYSL. For more information, please visit www.hyperion.com/cornerstones.



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Information Builders cost-effectively delivers enterprise BI at the operational, tactical, and executive level, providing the integration, scalability, and self-service usability needed for informed decision making and reporting standardization throughout the extended enterprise. Our iWay Software subsidiary's more than 280 adapters and universal adaptive framework incrementally facilitate service-oriented architectures.

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Temtec is a leading provider of self-service analysis and reporting software giving non-technical users the ability to analyze business critical information at the speed of thought for better informed decision making. Temtec's key product, Executive Viewer®, is designed to optimize user access to information stored on multi-dimensional OLAP databases and includes connectivity to Microsoft Analysis Services, Hyperion Essbase, IBM DB2 OLAP, Applix TM1 and SAP BW. Temtec is a Microsoft Gold Certified partner and Preferred Partner of Hyperion. Temtec has customers in over 400 organizations in 50 countries. Further information and live demonstrations of Executive Viewer are available at www.temtec.com.



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