TDWI

JUNE 2005

The Keys to Enterprise Business Intelligence: Critical Success Factors

By Wayne W. Eckerson

Director of Research
The Data Warehousing Institute

SPONSORED BY

Business Objects™

tdwi
THE DATA WAREHOUSING INSTITUTE
A DECADE OF EXCELLENCE

About the Author

WAYNE W. ECKERSON is the director of research for The Data Warehousing Institute (TDWI), a worldwide association of business intelligence and data warehousing professionals that provides education, training, certification, and research. Eckerson has 17 years of experience in the IT industry, most of which has been spent covering data warehousing and business intelligence.

Eckerson is the author of many in-depth reports, a columnist for several business and technology magazines, and a noted speaker and consultant in the business intelligence industry. He has recently written a book titled *Performance Dashboards: Measuring, Monitoring, and Managing Your Business,* which will be published by John Wiley & Sons in October 2005. He can be reached at weckerson@tdwi.org.

Besides his research duties, Eckerson coordinates TDWI's BI Strategies program, a quarterly educational event that brings together thought leaders and practitioners in the business intelligence field to discuss and share ideas about emerging trends and technologies. Prior to joining TDWI, Eckerson was a senior consultant at the Patricia Seybold Group and director of its Business Intelligence & Data Warehouse Service, which he launched in 1996.

About Our Sponsor

BUSINESS OBJECTS is the world's leading business intelligence (BI) software company. With more than 30,000 customers worldwide, including over 80 percent of the *Fortune* 500, Business Objects helps organizations gain better insight into their business, improve decision making, and optimize enterprise performance. The company's business intelligence platform, BusinessObjects™ XI, offers the BI industry's most advanced and complete platform for reporting, query and analysis, performance management, and data integration. 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, and offers consulting and education services to help customers effectively deploy their business intelligence projects.

Business Objects has dual headquarters in San Jose, CA, and Paris, France. The company's stock is traded on both the Nasdaq (BOBJ) and Euronext Paris (ISIN: FR0004026250—BOB) stock exchanges. More information about Business Objects can be found at www.businessobjects.com.

Promise and Reality

The Promise of Self-Service BI. When end-user reporting and analysis tools made their debut in the early 1990s on Windows desktops, many experts believed the tools would liberate end users from their dependency on the IT department to create and deliver custom reports. The combination of these tools and newly minted data warehouses caused pundits to proclaim that the era of "self-service" business intelligence (BI) had arrived.

However, reality quickly fell short of promise. It turned out that a majority of users found early versions of BI tools too difficult to use, and continued to rely on the IT department to create custom reports. And many of the remaining "power users" used BI tools simply to download huge data sets to their desktops—clogging networks and bogging down query performance for everyone else. They then dumped the data into Microsoft Excel or Access, where they conducted their "real" analysis, creating dozens, if not hundreds, of spreadmarts and undermining data consistency.

Migrating BI to the Web is not Enough to Deliver True Enterprise BI

The advent of the Web as a BI delivery vehicle has made it easier for organizations to deploy business intelligence on an enterprise scale. The Web centralizes administration, removes the need to install software on users' desktops, and provides an intuitive user interface that reduces user training and support costs. However, simply migrating BI to the Web is not enough to deliver enterprise business intelligence so that all employees can easily access, analyze, and act on relevant and timely information.

BI Platforms. To transform business intelligence from a workgroup or departmental initiative geared to business analysts into an enterprise resource that empowers all users, organizations need more than just BI tools. They need a BI platform that supports a variety of reporting and analysis processes and applications and runs against a robust data management infrastructure that delivers a consistent view of the business. This combination delivers the right information to the right person at the right time, creating a nimble, fast-moving organization that is much more responsive to market changes and customer requirements.

BI Platforms Are The Next-Generation BI Tools

A BI platform offers many advantages. It provides of a core set of functionality and modules designed to meet the unique information and analytical requirements of a broad range of users within the enterprise. It lets developers rapidly customize and extend the BI platform's core BI components and services to create new analytic applications or embed BI functionality within existing applications. It also supports metadata linkages to data integration tools and other upstream and downstream systems to create an integrated BI environment that is easy to adapt to evolving business requirements. Finally, both the BI and data platforms are built on a scalable and extensible infrastructure that meets data center requirements for reliability, availability, and performance.

Given these new capabilities, organizations should take the opportunity to reevaluate their business needs, user requirements, and technical architecture before purchasing new BI tools or extending existing BI licenses. BI platforms can help transform the

way organizations leverage and exploit information, but this won't happen unless executives and managers take a step back and approach BI strategically. They need to create a road map that consolidates pockets of BI tools, performance management, and reporting repositories throughout the organization, and create a mission-critical, enterprise BI platform that supports the reporting and analytical needs of all workers in the organization.

Critical Success Factors

Leading vendors are now beginning to deliver BI platforms that are finally realizing the promise of self-service business intelligence for all users. This new generation of BI software exhibits six main characteristics. While few vendors today deliver all the capabilities described below, these characteristics provide a way to gauge vendors' progress toward meeting the enterprise BI requirements.

The rest of this paper will discuss each of these characteristics.

Characteristic #1: Support All Users Via Integrated BI Suites

One Vendor Versus One Tool. Executives have always sought to purchase a single BI tool for the enterprise to reduce administration, training, and support costs and minimize the number of suppliers and redundant software. They quickly discovered, however, that one tool can't possibly meet the needs of different types of users, and begrudgingly allowed departments and teams to purchase different tools, sometimes from different vendors.

BI Suites Enable Executives to Deal with One Vendor While Meeting All Users' Needs

Fortunately, leading BI vendors are heeding the calls of executives. However, rather than delivering a single BI tool, leading vendors are delivering BI platforms that support suites of integrated BI tools or modules. These suites integrate a wide range of functionality that meets the reporting and analytical requirements of many different types of BI users. They also enable executives to negotiate volume discounts with a single supplier while delivering specialized functionality to distinct segments of users.

User Characteristics Drive Segmentation. To leverage these suites, organizations need to identify all of the different types of BI users in the organization. To fully leverage the functionality offered by BI platforms, organizations need to identify the different types of BI users. Most companies create between four and eight different segments of BI users based on one or more of the following characteristics:

1. **Business role.** Typical roles include executive, manager, power user, business analyst, customer, and supplier, but the roles may be more granular.

2. **Analytical need.** Users can be segmented by whether they need to author, customize, interact with, or view reports, query source data, create forecasts, develop planning scenarios, or develop statistical models.

3. **Access and delivery preferences.** Different users may prefer to access or receive information via different methods, such as Windows, the Web, e-mail, wireless devices, or printers.

4. **Technical and analytical literacy.** Individuals vary by the degree to which they are comfortable working with computers and know how to analyze and interpret data. This is a gating factor on BI usage.

Once an organization identifies distinct user segments, it then needs to map BI functionality to each segment. (See Exhibit 1.) Using a BI platform, administrators can then turn BI functionality "on" or "off" to meet individual or group requirements using dynamic, role-based security. For example, a BI platform may allow a small group of users to author reports, a larger group to modify those reports and export to Excel, and the largest group to receive static views of the reports by e-mail.
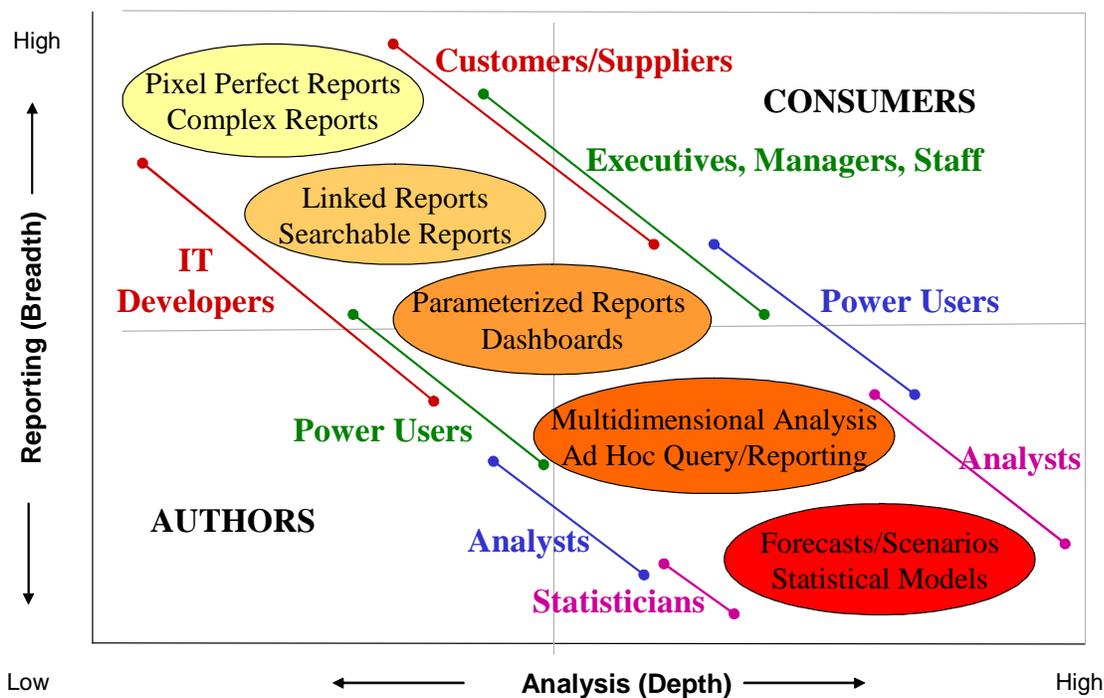

Exhibit 1—Mapping BI User Segments to BI Functionality. *This chart maps different types of BI users to BI functionality, arranged according to breadth of delivery (reporting) and depth of insight (analysis). This summarized view depicts four types of BI consumers and four types of BI authors. Some organizations may have more user and author segments and finer-grained descriptions of BI functionality.*

Common Framework. The BI platform enables organizations to purchase additional modules to support more than just bread-and-butter reporting and analysis functions. For example, a BI vendor may offer statistical tools that enable users to analyze customer segments. Or they may offer modules for creating Balanced Scorecards or developing pixel-perfect reports for invoices or statements. Modules that run off the

same extensible BI platform are tightly integrated and possess a common look and feel, reducing end-user training; users feel like they are using a single BI tool rather than multiple tools.

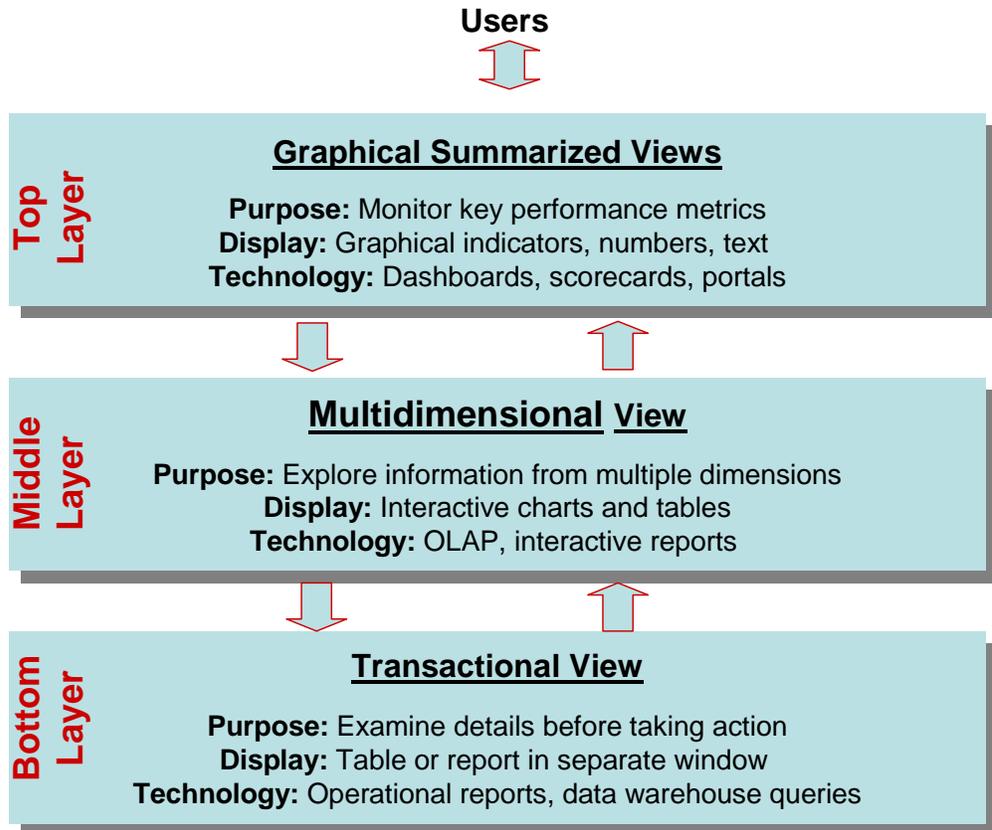## *Characteristic #2: Conforms to The Way Users Work*

The problem with earlier generations of BI tools is that they force users to conform to the way the *tools* work, rather than conform to the way *users* work and prefer to interact with information.

Most Users Don't Want to Analyze Data Unless there's an Exception Condition

User Mantra. Leading BI vendors now target the information needs of the majority of users within an enterprise, which are best summed up in the mantra: "Give me all the data I want, but only the data I really need, and only when I really need it." In other words, most users don't want to spend time analyzing data unless there is an exception condition that demands their attention. When that happens, they want immediate access to all relevant information, but in a systematic and structured way so they don't get lost in the data.

Performance Dashboards. BI platforms support this user mantra by providing Web-based performance dashboards that let users monitor key metrics at a glance. When performance is above or below expectations, users can drill down into successive layers of detail. Performance dashboards support operational, tactical, or strategic analysis and are often called "scorecards" when used for tactical or strategic purposes. By tailoring key performance indicators (KPIs) for individual users, performance dashboards align user activities with strategic objectives and optimize individual and group performance.

Employees find performance dashboards easy to use because they structure drill paths from top-level summaries to detailed reports so users can quickly and efficiently find the information they're looking for. Many also provide context-sensitive recommendations that guide users to a relevant report or view of information. In addition, most performance dashboards send users customized alerts about critical events wherever they are via e-mail, pager, wireless device, or any other channel or device. (See Exhibit 2, following page.)

Users

Top Layer

Graphical Summarized Views

Purpose: Monitor key performance metrics
Display: Graphical indicators, numbers, text
Technology: Dashboards, scorecards, portals

Middle Layer

Multidimensional View

Purpose: Explore information from multiple dimensions
Display: Interactive charts and tables
Technology: OLAP, interactive reports

Bottom Layer

Transactional View

Purpose: Examine details before taking action
Display: Table or report in separate window
Technology: Operational reports, data warehouse queries

Exhibit 2—Performance Dashboard Layers. Each successive layer in a performance dashboard provides additional details and perspectives, enabling users to move from reactive monitoring to proactive analysis and action. In this way, performance dashboards conform to the way most users want to work, providing only the information they need when they need it. (Source: Wayne Eckerson, Performance Dashboards: Measuring, Monitoring, and Managing Your Business, *John Wiley & Sons, October 2005.)*

In addition, performance dashboards conform to the way users work because they are:

- **Customizable.** Administrators can configure performance dashboards to deliver functionality, reports, and views that are customized by user segments or roles or even by individuals, if they carry enough clout in the organization. Since customized views are delivered dynamically based on users' BI security profiles, organizations can deploy a single platform that conforms to the individual requirements of all its users.

- **Personalizable.** Users should be able to personalize the BI home page, portal, or dashboard screen with the metrics, reports, links, and other documents they want to view, as well as select the fonts, colors, and styles they prefer. When users personalize their home pages, they are more motivated to come back.

- **Flexible.** BI platforms enable users to access information, views, and reports from any client or device they prefer, including the Web, desktop applications

like Microsoft Excel or PowerPoint, e-mail, or wireless devices. For instance, a user who receives an alert via a cell phone should be able to view the report that triggered the notification on the phone's display. Users should be able to interact with these reports, just as they can with Windows and Web-based alternatives, as well as refresh, schedule, and modify reports.

- **Collaborative.** Decisions aren't made in a vacuum; users normally send reports and views to others for review and comment. BI platforms facilitate this type of collaboration by supporting annotation, workflow, and threaded discussions.

- **Guided.** BI platforms help users avoid getting lost in the data and provide context to assist in their analysis of the information once they locate it. Some BI platforms guide users by structuring drill paths and prompts, while others provide context-sensitive recommendations for next steps and related information to view.

Characteristic #3: Integrates with Desktop and Operational Applications

Closing the Loop. The more BI platforms conform to the way users want to work, the more they disappear into the background, blending into core applications and central processes. Rather than shift to a separate application to view reports, users should be able to view information within the same application in which they perform their everyday tasks. This closes the loop between analysis and operations, enabling users to take prompt action based on relevant information and analysis.

Many Users Prefer to View Reports Within Microsoft Office Applications

Microsoft Office Integration. Microsoft Office applications such as Excel, PowerPoint, Outlook, and Word are pervasive and widely used. Many users would prefer to access and view reports natively within these applications, especially Excel, which lets users further analyze and calculate information and display it using a rich set of charting objects and formatting features.

BI platforms enable users to use Microsoft Office applications as their de facto BI clients rather than having to learn a new tool to access, analyze, display, or exchange data. For example, Excel users can view, interact, and customize BI reports in Excel format without having to first launch a BI tool and then export to Excel. PowerPoint and Word users can embed BI reports into a slide or document, respectively, and automatically refresh the data in those reports with a click of the mouse—without having to connect directly to a BI server. In the same way, Outlook users can display, refresh, and interact with key metrics and reports and share them via e-mail.

BI Components and Services. To embed business intelligence into operational applications, BI vendors need to provide a programmatic interface to their core functionality from any software environment, such as Java, .NET, and Web Services, running on any hardware or operating system. Ideally, this interface should consist of calls to high-level components or services that are modeled in an object-oriented fashion and that support the full range of functionality available in the packaged BI

tool. The BI vendor should document the calls in a software development kit (SDK) that provides sample applications and a companion Web site that enables developers to exchange ideas and tips on how to develop custom applications that leverage the analytical components.

Embedded Design Tools. In addition, many leading BI vendors partner with software providers to embed BI design tools into third-party application development tools or packaged applications. This makes it easy for developers to add robust reports and analytical functionality to custom or packaged applications. They can leverage BI components within their preferred Microsoft or Java-based development tools and connect dynamically to runtime services on analytical servers. The result is applications that give end users full-featured reporting and analysis capabilities within the core operational applications they use on an everyday basis.

Portal Integration Kits. Since many applications today are built on Web-based portal platforms, leading BI vendors are supplementing their SDKs with portal integration kits that expose basic BI functionality in the format required by the portal's application program interface (API). This may include HTML tags, URL strings, Java servlet extensions, or .NET objects. Leading BI vendors ensure that these "portlet" connections support sophisticated process handling conventions, such as error recovery, error messaging, timing, and message queuing, and are kept in sync with portal vendor APIs.

Ultimately, BI Becomes a Ubiquitous Utility

Ultimately, BI becomes a ubiquitous utility that any developer or application can tap into on demand from any platform, network, or development environment. Just as you can plug an appliance into a wall outlet to connect it to the electric grid, you should be able to plug any application into a *BI utility* to generate relevant insights, analysis, and reports on demand. This will turn business intelligence from a nice-to-have tool into an enterprise resource that greatly enhances operational efficiency and organizational effectiveness.

Characteristic #4: Delivers Actionable Information

Many BI tools today are drifting rather aimlessly in the stagnant backwaters of organizational activity. That's because they deliver historic information that doesn't inform users about problems and opportunities quickly enough for them to change strategic outcomes. This happens when data warehouses only load periodic snapshots of data on a weekly or monthly basis, or when BI tools are unable to query multiple sources and join the results on the fly.

As a result, these business users believe BI tools are only useful for understanding historic trends and shedding insights and awareness about how the business operates in general. They don't perceive BI as a platform that tightly integrates with process-driven resources that deliver actionable information about current events, enhance operational decision-making, and optimize performance.

BI Vendors Can Help Organizations Increase the Velocity of Information

Right-time Data Integration Tools. However, leading BI vendors are now helping organizations improve the velocity of information that BI platforms deliver to end users. These vendors offer data integration tools that help customers develop "right-time" data warehouses and operational data stores. These replace periodic snapshots with continual updates that refresh the environment every several minutes or hours depending on when users need information to make timely decisions. These data integration tools use parallel processing, change data capture, and trickle feed linkages to enterprise application integration (EAI) backbones to increase data freshness and reduce decision latency. They can also unify metadata from sources to reports, giving end users vital information about the origin and composition of data elements and reports, and providing administrators a way to quickly assess the impact of source system changes on downstream reports and query objects.

Virtual BI Views. But, since organizations can't possibly load all the data users might want to examine into a right-time data warehouse or an operational data store, the BI platform must pick up the slack. Either directly or through technology partnerships, BI platforms must deliver virtual views of data spread across multiple systems and locations—including data warehouses and data marts—and then query those systems and join the results on the fly. This distributed query capability—sometimes called enterprise information integration (EII) technology—ensures that users are working with the freshest and most relevant data available, including external and third-party information sources. Distributed query engines can be embedded into almost any type of BI tool, including report writers, dashboards, and scorecards.

"What is Happening Now and What Should We Do About It?"

Advanced BI Tools. In a right-time environment, BI users examine not only what happened or why it happened, but also what is happening right now and what they should do about it. To do this, users migrate from using traditional BI tools to dashboards, scorecards, and decision engines that empower users with actionable information. Dashboards and scorecards often use EII technology or an operational data store (ODS) to populate different metrics on a single screen with right-time information. Decision engines eliminate human intervention altogether by using statistical models to automate well-known business processes and decisions, such as fraud detection, yield optimization, and Web site recommendations. (See Exhibit 3, following page.)
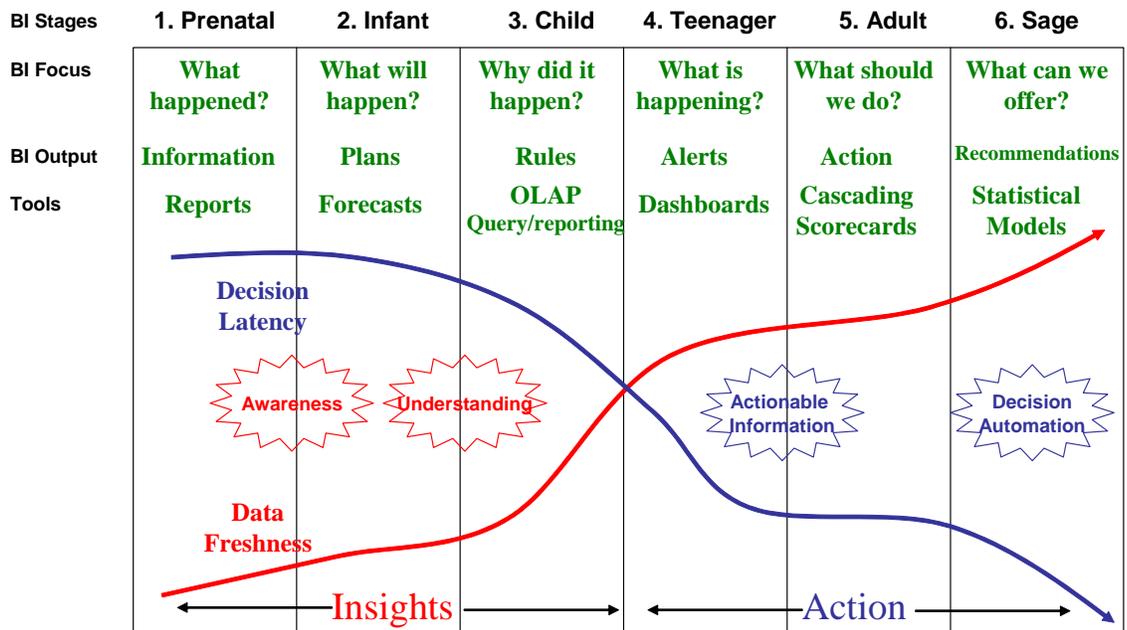
BI Stages	1. Prenatal	2. Infant	3. Child	4. Teenager	5. Adult	6. Sage
BI Focus	What happened?	What will happen?	Why did it happen?	What is happening?	What should we do?	What can we offer?
BI Output	Information	Plans	Rules	Alerts	Action	Recommendations
Tools	Reports	Forecasts	OLAP Query/reporting	Dashboards	Cascading Scorecards	Statistical Models

Decision Latency

Awareness   Understanding   Actionable Information   Decision Automation

Data Freshness

← Insights →   ← Action →

Exhibit 3—Stages of BI Development. *BI platforms deliver information to users in a timely fashion so they can take prompt action to affect outcomes and performance instead of just gaining historical insights about what went wrong or right. In highly mature environments, organizations use statistical models to automate well-known processes and decisions.*

When organizations deliver actionable information using data integration and distributed query tools, business intelligence becomes a strategic activity and a mission-critical enterprise resource.

Characteristic #5: Foster Rapid Development

Many business users abandon BI tools because the technical team supporting them can't deliver enhancements to the tools or reports fast enough to meet their needs. On average, organizations customize about 33 percent of every packaged application and spend 7.5 months to deliver a final product—way too much time to meet fast-changing user needs. Consequently, users revert back to spreadmarts or requesting overworked business analysts to create custom reports for them.

ADEs Support Codeless Development of Reports and Analytic Applications

ADEs. To accelerate the development of analytic applications and reports, leading BI vendors now offer analytic development environments—or ADEs—that let technically savvy business users (i.e. power users) rapidly create analytic applications without writing code. ADEs are the analytical complement to IDEs, which developers use to create transaction applications. Like IDEs, power users drag and drop visual components onto a graphical workbench and connect and configure the components to create an analytic application. ADEs promise to accelerate development from months to weeks for new reports and weeks to hours for modifications to existing reports.

Shift Development to Power Users. The drag-and-drop nature of ADEs shifts development responsibilities away from IT staff and application developers and toward power users in workgroups and departments. With an ADE, a power user can easily modify a packaged analytic application, flesh out a report definition, or create a new application or report from scratch once IT has established data connections and query objects. IT departments that create networks of power users equipped with ADEs will no longer suffer a backlog of requests for custom reports. ADEs will once and for all get the IT staff out of the business of creating reports so they can focus on what they are best at: building robust data architectures and abstraction layers for end users.

<div style="float:left">**ADEs Facilitate Rapid Prototyping**</div>

Rapid Prototyping. ADE tools also accelerate the trend towards rapid prototyping. Developers and power users can use an ADE tool in a joint application design session to get immediate feedback from users on data, application screens, metrics, and report designs. This iterative process results in better-designed applications that are delivered more rapidly. Many vendors are now shipping ADEs for specific applications to facilitate rapid prototyping. For example, many dashboard and scorecard solutions are ADEs.

Setting Expectations. Although ADEs promise to accelerate development tasks, the BI team needs to set expectations appropriately. Even the best ADE can't speed the development of a new report when the data doesn't exist in a clean, consistent, and queryable format. The industry best practice for adding a new subject area to a data warehouse is three months. This includes analyzing, modeling, extracting, transforming, loading, cleaning, testing, and validating the data to ensure that users receive high-quality information. However, once the data is available in a usable format, power users armed with ADEs should be able to pump out custom reports in a matter of hours, days, or weeks, depending on the complexity of the task.

Characteristic #6: Provide a Robust, Extensible Platform

Just as tall buildings need a strong and deep foundation to ascend skyward, BI platforms need a strong technology infrastructure to support the reporting and analysis requirements of the entire enterprise. Leading BI vendors are now delivering mission-critical BI platforms that support the following 12 characteristics:

1. **Multiple Server Platforms.** The BI platform runs on a range of server systems, including Windows, UNIX, Linux, and others, that can be distributed to leverage available CPUs throughout the organization regardless of the operating system.

2. **Service-Oriented Architecture.** A service-oriented architecture (SOA) provides a series of application and systems-level services built using a consistent component architecture, such as J2EE, .NET, CORBA, or Web Services. An SOA creates an extensible platform that lets vendors plug in new technologies, services, interfaces, and engines without major, time-consuming rewrites to the architecture. SOA components and services can be invoked by one or many applications, and reused or modified to accelerate the

development of new functionality. Administrators can also create multiple instances of a service on one or multiple machines, providing higher availability and scalability.

3. **Designed for the Web.** BI platforms are designed for the Web, allowing users to view, interact, and modify reports using a zero-footprint client. The best Web-based BI tools deliver the robust functionality of desktop tools without plug-ins, applets, or immense amounts of JavaScript that clog networks and get snagged in firewalls. However, to meet the demands of complex report design, thick clients and rich clients remain extremely important. These tools are often used in conjunction with other thick-client tools like Microsoft VisualStudio.NET or Borland JBuilder to build both Web and client/server applications, including complex reports.

4. **Runtime Metadata.** The BI platform uses a single-object model to support all modules in the BI suite, providing consistency and flexibility. It stores the object model and other metadata in a runtime repository that application engines use to deliver services. For example, the query engine will consult the repository to translate a query request into the appropriate SQL for a specific back-end database. Or, the report engine might consult the repository when creating customized views of reports based on security parameters and user profiles. Or, the caching engine will check the repository to see what data and files have been previously run within a given time frame to determine whether to fulfill a query request locally.

5. **Dynamic Security.** The BI platform provides authentication and access control services via the metadata repository, or it can link dynamically to other security mechanisms. The platform should have complete access to third-party security systems, such as LDAP, Microsoft Active Directory, and other security management services.

6. **Clustering.** To provide adequate scalability for enterprise environments, BI platforms dynamically distribute processing across multiple, interconnected servers. The BI platform lets administrators run multiple instances of the same service (e.g., a reporting engine) as well as multiple instances of the entire BI environment on multiple servers.

7. **Distributed Processing.** To provide adequate query response times, BI platforms distribute the workload to the most appropriate layer in the BI architecture—clients, application servers, or database management systems— while minimizing network traffic that could affect performance. They also use database-specific SQL to leverage vendor-specific database features, such as aggregate navigation, stored procedures, and complex data types.

_____

8. **Multi-level Caching.** BI platforms make extensive use of secure caches to ensure reasonable performance, especially if they are running against relational databases. BI tools should cache reports, query filters, data sets, database connections, and log-in information, among other things.

9. **Dynamic Resource Allocation.** The BI platform dynamically allocates resources (e.g. memory, threads, pipelined tasks, disk) based on workload or other factors. It also uses queues to distribute requests to threads as they become available, prevent loss of data during outages, and prioritize requests based on system-level agreements.

10. **Query Governing.** Query governors are necessary to prevent a single user or query from hogging all the resources of a system. Query governors can be "activist"—killing or postponing queries based on predefined rules—or "passivist"—providing suggestions to users about the nature of queries. Most query governors also track usage and thus can be used to support chargeback policies and enforce concurrent user licenses.

11. **Report Broadcasting Services.** Robust BI platforms use report delivery engines that:
    a. send a report to multiple users via a single channel (i.e. broadcasting),
    b. send a report to multiple users via multiple channels (i.e. multicasting),
    c. send multiple versions of the same report to different users across multiple channels (i.e. bursting),
    d. display elements of a report before all elements have been downloaded (i.e. streaming), *and*
    e. display pages of a complex report only as users request them (i.e. page on demand).

12. **Real-time Management.** BI platforms provide graphical monitors that display real-time information about CPU cycles, queries, memory usage, and other systems resources and let administrators kill and restore processes, reconfigure services, threads, thresholds, and so on. These consoles manage both local and remote BI servers and integrate with third-party system management tools. The system monitoring tools also support compliance requirements by giving administrators the ability to audit the system, track the lineage of data objects and reports, and perform impact analyses on system changes.

A BI platform uses a flexible, component-based architecture to support these 12 characteristics and deliver sufficient scalability and performance to run as a peer with other enterprise applications in the corporate data center.

Conclusion

BI platforms have come a long way in a short time. A decade ago, desktop BI tools were designed for adventurous business users who were stymied by the backlog of custom reports piling up in the IT department. Today, leading BI platforms have traversed technology shifts from client/server computing to the Web, while adding a host of capabilities that have transformed them from departmental playthings to enterprisewide, mission-critical resources that drive the business.

These new BI platforms meet the information and analytical needs of all users in an organization and beyond. They conform to the way users want to work instead of forcing users to conform to the way the tools work. They provide an exceptional level of integration with Microsoft Office tools and can be embedded in operational applications, portals, or packages. At the same time, BI platforms provide tight linkages to data integration tools that foster metadata exchange and the delivery of right-time, actionable information. To support mission-critical applications, BI platforms are designed with data center–caliber scalability and performance.

BI tools have undergone many transformations during the past 15 years. The new generation of BI platforms embodies an increasingly mature set of technologies that can help 21st-century organizations both empower employees with relevant and timely information and compete more effectively in the marketplace.