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has a positive connotation. No matter which terminology you use, keep the ultimate value of business intelligence in mind:

Business intelligence allows people at all levels of an organization to access, interact with, and analyze data to manage the business, improve performance, discover opportunities, and operate efficiently.

What Business Intelligence Is Not

A data warehouse may or may not be a component of your business intelligence architecture (see Chapter 2), but a data warehouse is not synonymous with business intelligence. In fact, even if you have a data warehouse, you could only say your company is using business intelligence once you put some tools in the hands of the users to get to the data to make the information useful.

BI

The acronym for business intelligence is BI, and as information technology (IT) people like to use a plethora of acronyms, BI is one more that can sometimes cause confusion. BI as in “business intelligence” is not to be confused with “business investments” (although BI is something the business may invest in), “business insight” (although it is something BI may provide), or “bodily injury” (if you are using BI in the context of insurance). Even within the BI industry, confusion abounds as some people use BI to refer to the whole technical architecture (including the data warehouse, described in Chapter 2) as well as the user front-end tools (described in Chapter 3). Others think of BI as referring only to the front-end tools.

How Business Intelligence Provides Business Value

Business intelligence cuts across all functions and all industries. BI touches everyone in a company and beyond to customers and suppliers. As stated earlier, though, business intelligence can only provide business value when it is used effectively by people. There is a correlation between the *effective* use of business intelligence and company performance.¹

BI facilitates gap analysis to understand why certain plants operate more efficiently than others.

In all these instances, accessing data is a necessary first step. However, improving performance also requires people's interaction to analyze the data and to determine the actions that will bring about improvement. Taking action on findings should not be assumed. People have political, cultural, and intellectual reasons for not taking the next step. To leverage business intelligence to improve performance, you need to consider all these issues. A company may implement a BI solution that provides intuitive access to data. If this data access is not leveraged for decision-making and acted upon, then BI has done nothing to improve business performance. The reverse is also true—when BI is used in a company without a sound business strategy, performance will not improve.

A key sign of successful business intelligence is the degree to which it impacts business performance.

Measuring the business impact of business intelligence can be difficult as improvements in performance are attributable to factors beyond business intelligence. How to measure business intelligence success is discussed in Chapter 4.

Operational BI

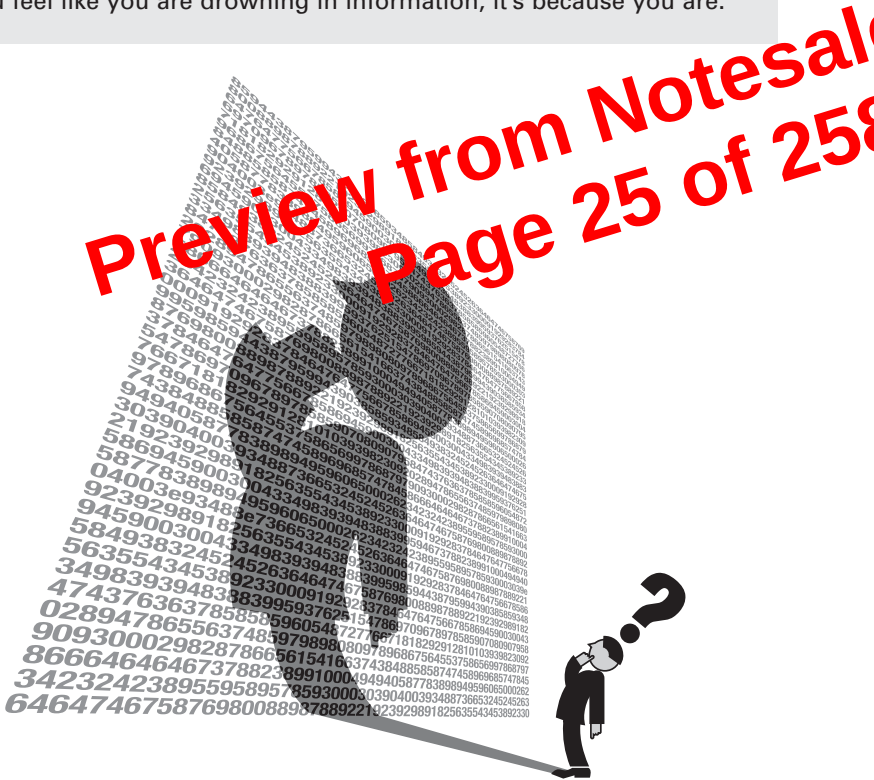
While early business intelligence deployments focused more on strategic decisions and performance, BI increasingly plays a critical role in the daily operations of a company. In this regard, accessing detailed data and reviewing information may be necessary to complete a task. For example, as part of accepting a new order, a customer service representative may first check available inventory. Such an inventory report may be a standard report developed within an order entry system or it may come from a BI solution, whether stand alone or embedded in the order entry application. Other examples of operational BI include the following:

- Travel agents and airlines use operational BI to monitor flight delays so they can proactively re-accommodate passengers with connections.
- Hospitals and emergency rooms will use business intelligence to determine optimum staffing levels during peak periods.

analyze is projected to grow anywhere from 25% to double in the next year.¹⁴ Add to that details such as clicks on a website to analyze the flow of information and shopping patterns, and you can see how the volume of data has exploded. In the past three years, the amount of digital data in Fortune 1000 companies has grown fivefold and in midsize companies, 50-fold.¹⁵

The average manager spends two hours a day simply looking for data, and half of the information found is later determined useless.¹⁶

If you feel like you are drowning in information, it's because you are.



When business intelligence is deployed effectively, all that data becomes a strategic asset to be exploited. The proverbial needle in the haystack may be the single insight about a customer that locks in their loyalty. Or it may be the secret to lowering production costs.

At the Speed of Thought It might seem that with the explosion of data, accessing more data would get slower. Yet computer processing power and addressable memory have increased to the point that

accessing that data can now be done at the speed of thought. Twenty years ago, you might have waited a month for a complex, printed report that ran on a mainframe computer for days. Ten years ago, that same report might have taken hours, a marginal improvement. Today, the same report may run in seconds on a purpose-built business intelligence appliance and be delivered to a BlackBerry mobile device.

Web-Based BI Web-based business intelligence has allowed tools to be deployed across corporate intranets and extranets to thousands of employees and external customers in a matter of hours. With the client/server computing of the early 1990s, it took days to install and configure PCs for just a handful of users. The Web has simultaneously broadened the reach of BI while allowing IT to lower the cost of ownership of BI.

BI Suites and Toolsets Business intelligence tools have multiple front-end components, such as business query tools, OLAP, and dashboards (discussed in Chapter 3). These components are optimized for different users' needs and usage scenarios. Previously, companies had to buy these multiple components from separate vendors. Interoperability was nonexistent and the cost to deploy was high. As a single vendor now offers a full suite or toolset and the components are integrated from a usability and infrastructure point of view, business intelligence can reach more users, based on their unique requirements and again at a lower cost of ownership. Web-based business intelligence and the expanding breadth of BI suites have brought economies of scale to BI, providing more functionality to more users at lower costs than before.

Other Emerging Technologies Web 2.0 and BI 2.0 technologies are bolstering BI's prevalence and making it more actionable through the following:

- Integration of search with BI gives a Google-like interface to BI and allows users to more easily find relevant information.
- Rich Internet applications that allow users to view a table and dynamically sort and filter the data—without being connected to a BI server and without going through an advanced authoring environment.
- Flashier web-based visualizations that both are more appealing and offer rapid insight into trends.
- Integration with mobile devices such that users can receive alerts on BlackBerry devices or access customer reports while visiting the customer.
- BI gadgets that are mini reports and visualizations immediately accessible without having to log into a separate BI application.

Techno Babble: Components of a Business Intelligence Architecture

Every BI deployment has an underlying architecture. The BI architecture is much like the engine of a car—a necessary component, often powerful, but one that users, like drivers, don't always understand. For some companies new to BI, the BI architecture may primarily be the operational systems and the BI front-end tools. For more mature BI deployments and particularly for enterprise customers, it will involve ETL (extract, transform, and load) tools, a data warehouse, data marts, BI front-end tools, and other such components.

When IT discusses BI with users, we readily fall into technobabble, and senseless acronyms abound. Most car drivers know that cars have a battery, a transmission, a fuel tank—an adequate level of knowledge for having a conversation with a mechanic or salesperson but arguably not so much expertise to begin rebuilding an engine. In this chapter, then, I'll present the major architectural technical components that make up BI and that business users should have at least a high-level understanding of to participate in discussions about building and leveraging a BI solution. If you are a technical expert, you might find this chapter to be overly simplified and it is. If you are looking for a reference on any one of these components, consult the list of resources in Appendix B.

Chapter 3 explores the sleek “chassis” of this BI architecture.

Difference	Operational System	Data Warehouse/Data Mart
Purpose	Primary function is to process orders, post journal entries, complete an operational task	Primary purpose is to provide access to information to manage the business by providing insight that leads to improved revenues, reduced costs, quality customer service, and alignment of strategic goals.
History	Current information with very little history	Larger amounts of history allow multiyear trend analysis, this year versus last year comparisons.
Timeliness	Real-time information	Information extracted on a periodic basis (hourly, daily, weekly). More recently, operational data warehouses may extract information in real-time or several times throughout the day.
Level of detail	Detailed data down to the line item or level of data entry	Aggregated data with varying degrees of granularity.
Response time	Fast inputs, but slow queries	Read-only; tuned for fast queries.
Table structure	Normalized tables in thousands	Parts of the data warehouse may be normalized but the parts business users query are normally denormalized star or snowflake schemas. The data warehouse will have fewer tables than the source systems have.
Dimensions	Rarely hierarchical groupings	Hierarchical groups give level of time, chart of accounts, product groupings, customer groups, and so on.
Reporting and analysis	Fixed reports by one detailed dimension (cost center, plant, order number)	Fixed or ad hoc reporting and analysis by multiple dimensions across all business functions.

Table 2-1 Comparison of Operational Systems with Data Warehouses

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articulate the expected ROI. When something has become the “cost of doing business,” then trying to document costs savings, efficiencies gained, and revenue contribution can be painful, if not impossible. Imagine if someone asked you to provide the ROI for having an office telephone! Documenting the ROI of a business intelligence project is meant to ensure the project will provide measurable business value. If you are struggling to estimate the ROI, you are probably trying to quantify too precisely imprecise benefits, or you haven’t given enough thought for how business intelligence will support your company’s key business drivers.

Calculating ROI

Despite the limitations of using ROI as a measure of success, it is a number that provides a basis for comparison to other BI implementations and IT initiatives. It also is a measure well understood by business users who have to buy into the value of business intelligence. In this respect,

About Continental Airlines

Continental Airlines is the world’s fifth-largest airline, with 3,100 daily departures throughout the Americas, Europe, and Asia. Having once had one of the poorest reputations in the industry in the early 1990s, the airline now has one of the best and is one of the few that have avoided bankruptcy following the September 11th terrorist attacks. *Fortune* magazine has repeatedly named Continental the number one Most Admired Global Airline on its list of Most Admired Global Companies.

About BI at Continental

- **Start of BI efforts:** 1998
- **Executive level sponsor:** CIO
- **Business Intelligence Competency Center:** Yes, since 1998
- **Number of BI users:** 1,400 data warehouse users counted with an estimated additional 24,000 through custom BI applications, or 57% of employees
- **Number of source systems used for BI:** 27
- **ETL/EIM tools:** Custom
- **Data warehouse platform:** Teradata
- **Data warehouse size:** 8TB, with portions updated in real time
- **Number of subject areas:** 24
- **BI tools:** Hyperion, SPSS, custom applications

About Corporate Express

Corporate Express US, Inc., a subsidiary of Corporate Express NV (NYSE: CXP) is one of the world's largest business-to-business suppliers of office and computer products and services, with 2006 sales of approximately \$4.9 billion in North America. The company operates in more than 17 countries and is reportedly the only business-to-business (B2B) office products company with a true one-company global capability. It delivers an average of \$16 million in office and computer products every business day in North America, servicing approximately 90% of the Fortune 500 companies. In addition to commercial brands, Corporate Express also has its own private label of office products, a line of business that has grown rapidly in the last three years, empowered by business intelligence.

About BI at Corporate Express

- **Start of BI efforts:** Initially 2000, revamped in 2004
- **Executive level sponsor:** CFO
- **Business Intelligence Competency Center:** Yes
- **Number of BI users:** 3,000 internal or 34% of employees, plus 10,000 customers
- **Number of source systems used for BI:** 7
- **ETL/EIM tools:** Ab Initio
- **Data warehouse platform:** Oracle and Netezza
- **Data warehouse size:** 10TB, with 98% updated daily and some updates every 10 minutes
- **BI tools:** MicroStrategy, SPSS

quality from the distributors, however, was low and inconsistent. The distributors could not readily see this and had no incentive whatsoever to improve it. By giving distributors the information and access to the BI platform, they also derived value from the data and quality could improve.

For Corporate Express, providing customers access to the BI environment has become a necessary part of doing business.¹³ Corporate Express focuses exclusively on providing businesses with office supplies, whereas competitors such as OfficeMax have both retail outlets and a business-to-business model. A recent customer win for OfficeMax has been with BB&T Corporation, the fifth-largest bank in the United States. A key reason for this win is OfficeMax's ability to provide customers with online reporting to better manage the procurement process and the cost

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SUCCESS: An Idea from Frankfurt, Germany

Prior to the SAP implementation, Dow Europe had a relatively exceptional reporting system it called simply decision support system (DSS). It was mainframe-based and might be deemed archaic with today's Web and rich Windows interfaces, but at the time, it had all the key elements sales and marketing wanted: good data with easy drill down. As the contrast to newer tools such as Microsoft Excel revealed the DSS' limitations, the Frankfurt, Germany, sales office came up with its own reporting solution. It was a custom-built client/server application, optimized for field sellers, with personalized data, and intuitive, graphical interface. Jens Garby, global director Commercial IT and eBusiness, then the sales director for Germany, showed it to the European polyethylene director, Ronno Kreinberg (who later became the global vice president of performance plastics). Even 15 years ago, Kreinberg was an executive who saw the potential of information technology. He had power and influence where the information systems department had none. Kreinberg decided to make the Frankfurt initiative bigger, better, and broader. His new reporting application was boldly named SUCCESS.

While the SUCCESS team rapidly delivered a slick interface, with flashy charts and fast drill-down times, the Global Reporting Project floundered amid data quality issues and queries that ran for hours. "Global" was not all it was cracked up to be. We held a meeting with European executives and their business analysts to give a status update. For lunch, we served "spaghetti" to convey the theme of how messy it was to merge information globally.

Dow Globalizes

About 18 months into the project, we got lucky. Very lucky! Under the leadership of a newly appointed CEO, Bill Stavropoulos, Dow globalized its 15 business units. As the global reporting team learned the news in the cafeteria, many echoed a similar thought, "wow, did we get lucky!" No longer would businesses be run on a regional basis, but rather, on a truly global basis. Overnight, the global data warehouse became the *only* source of information for managers to run their businesses. Regional DSSs became useless overnight. The original SUCCESS project? It served the needs of field sellers for a while but data quality declined as regional transaction systems were phased out, and maintenance for the application was problematic when the original programmer left the company. The experience with the SUCCESS initiative, however, provided critical lessons to everyone on the Global Reporting Project that continue to hold true today for anyone in the BI industry:

know detailed requirements once they've been able to experiment with different tools and explore information to determine what most supports their vision. For example, EMA knew their patient data presented a unique business opportunity to improve care and emergency room operations. It was only after exploring the data and prototyping different reports and dashboards that the team arrived at the final metrics that provided the best insights and benefits.

Frustration

When companies first embark on business intelligence, a frequent starting point is to address the biggest pains. Sometimes the degree of frustration has to reach a boiling point before business intelligence becomes a priority. Frustration can come in many forms, whether it's the inability to answer simple questions, being held accountable for things without the right tools to do a job well, or, as many managers describe, the frustration at managing blindly without facts to support their decisions.

At Continental Airlines, the data warehouse began in 1998 driven by two key initiatives: revenue management and customer relationship management. Continental had only recently emerged from its second bankruptcy. Part of the airline's turnaround strategy was a *Go Forward Plan* that promised to transform the customer's flying experience and to appeal to more business travelers.¹⁵ Mike Gorman, senior director of customer relationship management, recalls trying to understand one thing about a single customer. "We couldn't. We had 45 different databases with customer information."¹⁶ It took a few years to get to a single view of the customer but now, detailed customer information is available within seconds of an event.

Frustration was a similar theme at 1-800 CONTACTS. 1-800 CONTACTS has been selling contact lenses via mail order, phone, and the Internet for 11 years.¹⁷ It has a unique challenge, though, in that its customers must go to a competitor—eye doctors—to receive a prescription.¹⁸ A key differentiator for 1-800 CONTACTS is customer service. The company first released its data warehouse in early 2005 as a way of addressing growing frustration among its customer service representatives. "All the agents were clamoring for information. We hire competitive people. The biggest dissatisfaction in their job was to have to wait until the next morning to look at a piece of paper taped to the wall to see how they were performing," recalls Dave Walker, vice president of operations. Employee turnover was high, and on exit interviews, agents complained

Importance of Organizational Aspects to BI Success



Figure 6-1 Executive support is one of the most important aspects to a successful BI.

Executive Sponsorship and Degree of BI Success

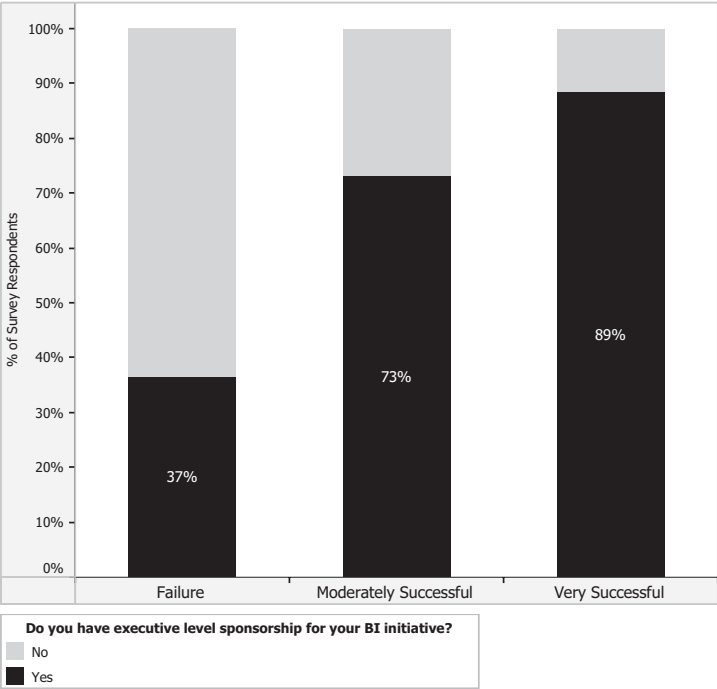


Figure 6-2 A greater percentage of very successful BI projects have a higher rate of executive sponsorship.

how successful a company rates their BI initiative. The portion of companies who have the CEO as their sponsor and classify their project as being very successful is 43%. This is higher than the average rate of success at 24% of survey respondents. Contrast this with the portion of companies who have the CIO as the sponsor and describe the project as very successful at only 21%, slightly lower than the average.

If you are a CIO reading this book, don't panic (yet). While it's not good news that the CIO is not necessarily an ideal sponsor, the problem is not with the individual executive per se but rather with the degree of influence the CIO wields with the business. If the CIO is viewed as a technocrat rather than a core member of the business team, then this lack of business alignment will get reflected in lower BI success rates and lower overall effective use of technology.

Public relations firm Burson Marsteller has been tracking the role of CIOs on boards of directors and executive committees for several years. They have found that in global Fortune 500 companies in which the CIO is a member of the board of directors, companies showed 9.2% higher annual returns than relevant indices.¹ The bad news is that in their study, a paltry 8% are members of the board of directors, with only a slight increase from 2003 to 2004.

There is, however, a difference between membership on a board of directors and in being an active member of the company's executive or operating committee. In the Successful BI survey, 67% of respondents say their CIOs are active members of the business team or operating committee. A 2007 eSurvey by *Optimize Magazine* found that 34% of CIOs were actively involved in driving major business decisions and another 45% are at least consulted on these decisions.²

These survey findings reveal an important point: if the CIO is not involved in the strategy of the business and is also the executive sponsor for a business intelligence initiative, the initiative will be met with less success; the company also may have lower financial performance overall.

Ultimately, the most effective sponsor for a business intelligence initiative is the individual who understands the full value of business intelligence and who wields influence, instills credibility, and fosters trust with all of the business and functional executives.

At Corporate Express, for example, the executive sponsor for the BI initiative is the CFO, Robert VanHees. Both the BI team and the

to which approach is more successful.¹¹ According to their survey, 39% predominantly follow Inmon's Corporate Information Factory or hub-and-spoke architecture, while 26% follow Kimball's data mart bus architecture. Both deployment approaches showed equal degrees of success. The only architecture that showed notably lower success rates was independent data marts.

The survey did not, however, look at who uses a combination of either approach, something that Dan Linstedt, chief technology officer for Myers-Holum, most often encounters. He advocates the Inmon, third-normal-form approach when there are multiple, disparate data sources.¹² He will use the Kimball dimensional approach when there is a single source system and for the presentation layer. Storing the data in third-normal form is one of the keys to success that Continental Airlines cites (see Chapter 2 for an explanation of normalization). The commitment to staging the data this way has allowed Continental to ensure consistency and reusability, while also providing flexibility for all the departments and business applications that access the data warehouse.

With the exception of Continental Airlines, the use of a particular data model approach is not something other successful BI case studies or survey respondents spoke about. In practice, I can attest that a poorly designed data model, particularly one that business users access, can prevent users from asking and answering their business questions with any degree of ease, and sometimes, not at all. Conversely, a data model optimized for business reporting and analysis facilitates insight and improves user adoption.

Master Data Management (MDM)

Master data management seems to be the latest buzz in the BI industry (see Chapter 2 for an explanation of MDM). Some of this buzz is fueled by vendor acquisition and innovation, and some by the hope that master data management will help improve data quality.

There are different types of master data: product, customer, region, facility location, and chart of accounts, to name a few. In Chapter 2, Figure 2-1, master data existed in multiple transaction systems. The order entry system used a different set of customer codes from the invoice system. Ideally, these codes would be the same regardless of the transaction system, and yet, that is rarely the case. Often, custom transaction systems will devise their own codes. ERP systems (shown in Chapter 2, Figure 2-2) will often share code tables across multiple

each contact person, there may be a unique customer code. If a user wants to understand global purchases by all the locations around the world, then these regional and global rollups must be maintained.

At question in the industry is if these codes and hierarchies should be maintained in the ERP system, the data warehouse, or in a separate master data management system. Increasingly, MDM experts advocate storing master data management separately and allowing both the transaction systems and data warehouse to access it. This has been Dow's philosophy since the late 1980s, when it began implementing its own global code system, Infrastructure for Code Administration (INCA). As shown in Figure 7-6, master data is created in INCA. INCA then distributes data to SAP (the ERP system), Siebel (the CRM system), the Human Resources (HR) system, the Product Lifecycle Management (PLM), and other source systems, which can append application-specific data as needed. Information is then extracted into the data warehouse.

Dow's global codes and approach to master data management were clearly ahead of the industry and continue to be so today. Dow recognizes its global codes as an ingredient to its successful use of business intelligence, particularly on a global basis. Despite MDM's importance at Dow, even Costa recognizes the challenges of organizing for MDM and securing funding. "It is a lost child that nobody wants. Whenever resources get cut, MDM is sunset. It's so behind the scenes that nobody understands the value." While MDM today may garner little business attention, one market research firm described 2006 as an "inflection point" with data governance driving market growth which leapt to thirty percent in 2006¹⁴.

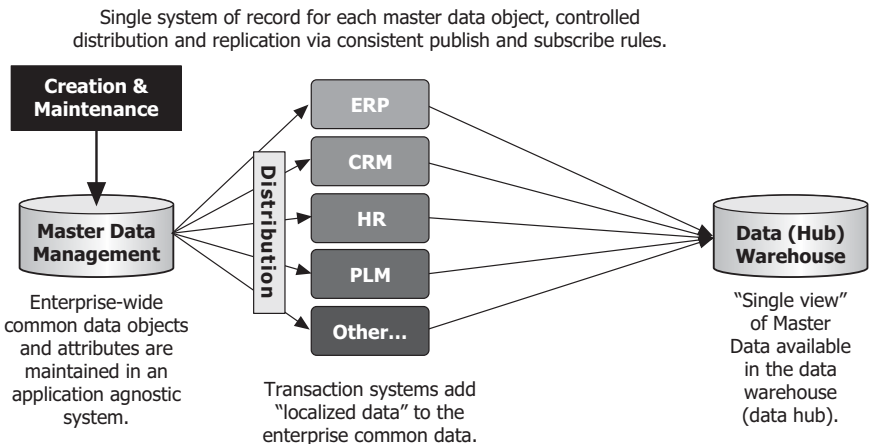


Figure 7-6 The Dow Chemical Company's MDM strategy¹³ (reprinted with permission)

Right-Time Data

In business intelligence's infancy, data warehouses were updated on a monthly, sometimes weekly, basis. As BI extends into operational applications, these data warehouses are increasingly updated in near realtime. The update to the data warehouse may be seconds behind transaction system updates, or minutes or hours, whatever best serves the business requirements. Industry expert Colin White, president of BI Research, refers to this as *right-time business intelligence*.¹⁵

While much of right-time business intelligence is about supporting operational decision-making, the timeliness of updates also increasingly allows decision makers to take swift action on strategic and tactical decisions. If, for example, a new product launch (strategy) is not performing as expected, it doesn't do executives much good to find this out three months into the launch based on monthly data warehouse updates. More timely updates allow for more timely insight and corrective action. 1-800 CONTACTS, for example, released its first data warehouse in spring 2005 with nightly loads from the source system.¹⁶ It wasn't until six months later when the data warehouse moved to updates every 15 minutes that senior executives embraced the system. While the call center may use the dashboard for operational purposes, the dashboard provides executives with a snapshot of how the business is doing in near realtime. Spikes in the number of inbound calls to the call center act as an early warning system for an upcoming increased load in the distribution center.

Dr. Richard Hackathorn, founder of Bolder Technology, talks about three components of data latency that affect decision making:¹⁷

- *Capture latency* is the time it takes between a business event happening and a piece of data being captured in a source system to when that data has been extracted into the business intelligence architecture.
- *Analysis latency* is the time it takes to disseminate, access, view, and analyze the updated information. Such dissemination and analysis may be in the form of a dashboard update, an alert, or a report refresh.
- *Decision latency* is the time to make a decision and take action based on the analysis.

Hackathorn suggests that reducing this data latency reduces the time to action. The reduced time to action has a corresponding business

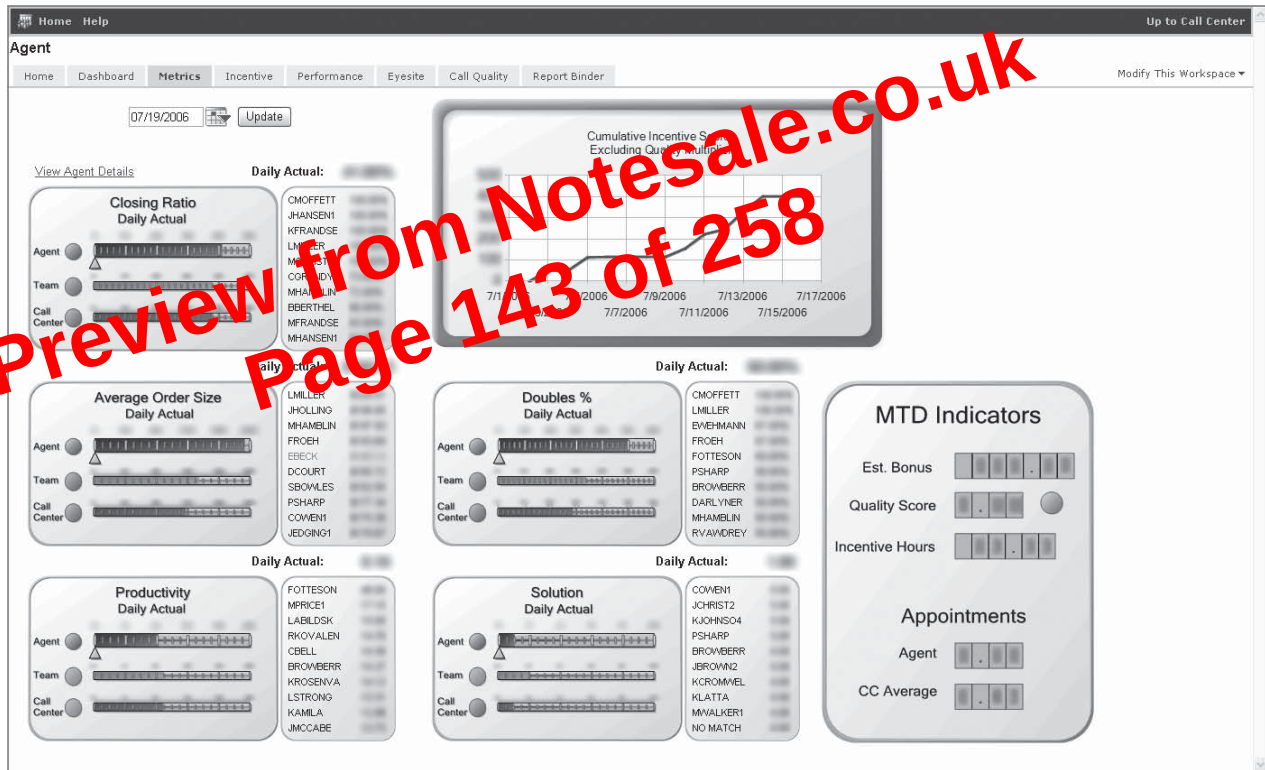


Figure 9-1 1-800 CONTACTS agent key performance indicators (Copyright 1-800 CONTACTS. Reprinted with permission.)

“just using business intelligence is its own reward!” (He is one of the enthusiastic users of BI who was previously starved for data and BI tools). He felt that perhaps the relationship between business intelligence and compensation is one of “six degrees of separation,” so, somewhat related but not obvious enough to be a motivator. Financial compensation, however, is only one form of incentive, and other forms of incentives in this idea of relevance are

- A desire to win, or to outperform their colleagues
- A desire to do a better job, whether to improve patient care or customer satisfaction
- A sense of happiness or removal of frustration that information they struggled to access and compile before has been made significantly easier to access

There are a number of barriers to BI success, and individual resistance to change is one of them. When this is the case, then incentives—whether financial or other—can play a positive role in encouraging people to use business intelligence effectively. While I have encountered companies who use specific incentives to encourage BI use, a better approach is to integrate business intelligence into achieving a level of performance that is tied to an existing incentive.

Personalization

Personalizing business intelligence has a role in relevance. Personalization goes beyond simply matching the BI tool with the user segment as discussed in Chapter 12. Personalization involves tailoring the software interface, such as the menus and capabilities, as well as ensuring each individual only sees the data relevant to him or her.

Row-level security is one approach to personalizing the data. With row-level security, each user is granted permission to see certain rows within the database. For example, at 1-800 CONTACTS, a given call center agent can see only his or her individual performance in the dashboard shown earlier in Figure 9-1. Each customer phone call and order record is associated to the agent so that in the dashboard, the information is personalized for that agent. This kind of personalization can be a challenge to implement when data is extracted from multiple systems and aggregated. For example, while it may be straightforward to associate the call and order records, and therefore the detailed rows

and they will come” mentality, nor did they “build what was asked for”; instead, they studied the activities of these potential users and delivered something that would benefit the individuals.

It is this model of development that is most required for extending BI beyond traditional information workers. Knowledge workers may have a better idea of what data and tools they need to do their jobs so a traditional requirements-driven development model may work for this segment. For others, though, it is up to the BI experts to study people’s jobs, daily decisions, and performance incentives, to discover these requirements. In short, relevance is about finding a way to use business intelligence to simplify their work and make it better.

Best Practices for Successful Business Intelligence

When it comes to extending the reach of business intelligence, relevance is a key factor to success. Relevance in business intelligence with an “it’s all about me” mindset. To make BI more relevant to all workers in your company:

- Study the drivers of company performance to determine which decisions and people will have the biggest impact. Don’t let BI priorities be driven only by those individuals who shout the loudest.
- Look at your current BI deployment rates by roles and understand where there is the biggest room for improvement. (Refer to Figure 4-5, Chapter 4 for current industry averages.)
- Personalize the content of BI applications—whether reports, dashboards, alerts, or scorecards—so that users have information in context and in a way that facilitates insight.
- Don’t rely exclusively on the traditional requirements-gathering process of asking people what they want; instead, study the way people work, incentives that influence them, decisions they make, and the information that supports those decisions to derive requirements.

car analogy again, you may change the oil frequently, the tires periodically, and the actual car every five years.

As an example, getting various stakeholders and individual lines of business to agree on consistent business definitions is difficult and time-consuming. Important metrics such as “customer churn” or “product profitability” can be calculated in a myriad of ways. Once everyone agrees on a definition, however, implementing a consistent calculation of such business metrics within a business view or scorecard is something that can be implemented rapidly. If, however, the definition or calculation logic has been hard-coded into extract, transform, load (ETL) processes or into physical tables in the data warehouse, then consolidating and changing these business rules can mean a major overhaul to multiple programs. Sometimes developers will hard-code business definitions into individual reports: stakeholders can’t agree, so a report is the “easiest” and fastest place to define an element. This has some short-term value until there is a new business rule. Now those hundreds of instances of “customer churn” or “product profitability” have to be changed in hundreds of individual reports, as opposed to in one business view. Such business-facing capabilities demand flexibility. Other components, such as the hardware for the BI server or data warehouse, may only need to be changed when a company wants to update the infrastructure or add capacity.

For every BI element, consider carefully where to place the capability and what promotes the most reusability and flexibility while balancing the trade-offs in risk, cost, and business benefit.

Agile Development Techniques

The concept of agile software development emerged from an informal gathering of software engineers in 2001.² The group published a manifesto, some of whose principles aptly apply to business intelligence.

Upon first reading the Agile Manifesto, I had to chuckle at “Welcome changing requirements...” In truth, changing requirements is typically something IT people dread because it means rework, which leads to a project deliverable that is over budget and late. However, with agile development, BI developers do not work from a precise list of requirements, in stark contrast to the waterfall approach. Instead, they work from a broad requirement, with specific capabilities that are identified and narrowed down through a prototyping process. This prototyping process may involve sample screens mocked up within an Excel spreadsheet, or reports and dashboards built within a BI tool. When using

A Subset of Principles from the Agile Manifesto

- Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.
- Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.
- Business people and developers must work together daily throughout the project.
- The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.
- The sponsors, developers, and users should be able to maintain a constant pace indefinitely.
- Continuous attention to technical excellence and good design enhances agility.
- Simplicity—the art of maximizing the amount of work not done—is essential.
- The best architectures, requirements, and designs emerge from self-organizing teams.

commercial software, building a report or dashboard takes a matter of hours, not days and weeks of custom-coded solutions. Discarding a prototype after a collaborative session is more expeditious than asking the business users to list precisely their requirements, having someone build a solution to those requirements, and then discovering that the requirements have changed or that there was a misinterpretation.

A project plan for a BI solution using agile development techniques is illustrated in Figure 10-3. A specific task is iterated and recycled until the project team is satisfied with the capabilities, within a defined time frame and in adherence to the resource constraints (time and people) agreed upon in the planning stage. Time frames are usually measured in weeks (as opposed to months and years in waterfall-style projects).

For this iterative process to be successful, the business users and the IT developers must work closely together in a collaborative fashion. Some BI project teams will establish “war rooms” to facilitate collaboration in which business users and IT developers routinely meet to review prototypes and hash out requirements. In addition to logistical issues such as war rooms, in order for such collaborative development to be successful, the business and IT must have a strong partnership as described in Chapter 8.

leaders, ensuring positive team morale, and a steady flow of deliverables. (Note: The precise title for this person will vary company to company. I am referring to data warehouse managers, directors of business analysis, data managers, and so on, collectively as “BI director.”) In small to mid-size businesses, the BI director is even more important because this may be the whole team or the director may have only a couple of full-time resources. Data modelers, report designers, and so on, may all be outsourced or supplemented with interim consulting services.

As I interviewed sponsors, users, and BI directors from multiple companies, people often attributed their BI success to the BI director, particularly in the smaller firms. What I found most interesting is the way these smaller companies described their BI directors; it was not an autocratic leadership style that led them to adopt business intelligence, nor do these directors want too much credit for their contribution. Instead, there is a degree of humility about the role they have played in their company's BI success. I started to think of these BI directors as what author Jim Collins describes as level 5 leaders in *Good to Great*.

Collins describes a level 5 leader as “an individual who blends extreme personal humility with intense professional will...Level 5 leaders channel their ego needs away from themselves and into the larger goal of building a great company. It's not that level 5 leaders have no ego or self-interest. Indeed they are incredibly ambitious—but their ambition is first and foremost for the institution, not for themselves.”¹¹ In the case of level 5 BI leaders, the ambition is for the success of the BI project and the vision for how it can add value to the company.

At one point, I was concerned my admiration for Collins's work was skewing my perception, that this phenomenon was perhaps not as big a driver of success as I was making it. But then I spoke to Dave Walker, the vice president of operations at 1-800 CONTACTS, who declared that one of the three key reasons for their BI success rests with their data warehouse manager, Jim Hill.¹² “Before Jim joined the company, everything was just queries. You might take cookies with you to the IT group depending on how badly you needed something. Jim established a discipline and vision.” I challenged Walker, arguing that anyone can come in and establish a greater sense of discipline. Walker was insistent that not all leaders are like Jim Hill. “He has an air of approachability, an air of competency, but he's very humble. He just wants to dig in and has an amazing service attitude. Jim will take our ideas and amplify them. He interjects energy into all these projects and is so engaging

success to that change. The reasons for the change varied, including licensing costs, vendor complacency, and need for a more flexible solution.

The Right Tool for the Right User

A common misconception about BI standardization is the assumption that all users must use the same tool. It would be a mistake to pursue this strategy. Instead, successful BI companies use the *right tool for the right user*. For a senior executive, the right tool might be a dashboard. For a power user, it might be a business query tool. For a call center agent, it might be a custom application or a BI gadget embedded in an operational application.

Use the marketing concept of customer segmentation to identify and understand the various user groups within your company. A simple starting point of classifying your users is recognizing that there are two main groups: information consumers and information producers. However, to match the BI tool with the appropriate user group, you need to refine these two user segments. Figure 12-3 shows how different user segments require different tool capabilities.

Segmentation is a way of looking at one large user base—for example, all employees in a company—and dividing it into smaller groups. Each segment, or smaller group, has similar characteristics, needs, and desired benefits. Segmentation provides a way of better understanding your users and why their requirements are different. Following are

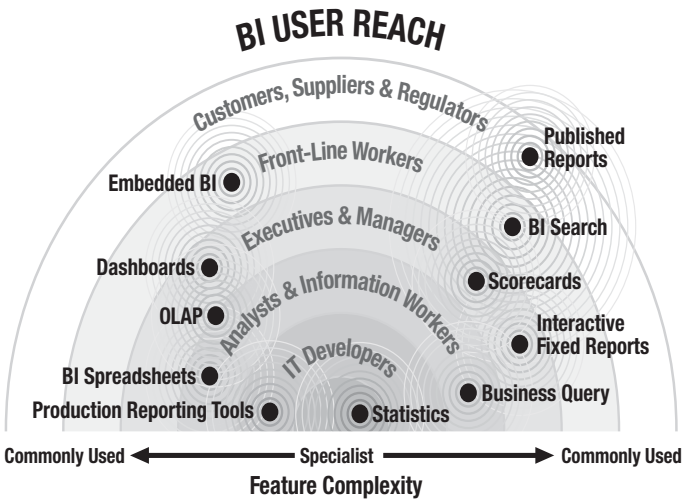


Figure 12-3 Different users require different tool capabilities.

get synthesized into what is our “gut” feel. For doctors in emergency rooms, gut-feel decision making may be all that time allows for. As Jonathan Rothman, director of data management at Emergency Medical Associates, says, “Doctors often have to rely more on experience than fact-based decision making. They get so used to making big decisions based on so little information. In the emergency room, you may not have time to run a lot of tests, and you have to make fast decisions. So for other things like the efficiency of the emergency room, we have to teach them the importance of getting the complete picture.”³

The problem is when biases and inaccurate data also get filtered into the gut. In this case, the gut-feel decision making should be supported with objective data, or errors in decision making may occur.

Take the case of a small plastics packaging business. One of their most important national customers was consolidating suppliers, and the plastics packaging company was about to lose one of their best longtime customers. Or so they thought. At the threat of losing this customer, the company began looking for ways to retain the customer. With a new purchasing manager in place at the customer, a long-standing relationship was not an influencing factor in the decision to change suppliers. It was price and price alone. While this customer accounted for a significant portion of the supplier's revenue, when the supplier analyzed the profit margin for this customer, they found little to none. This customer was certainly keeping the supplier busy, but they were not helping them improve profitability. The supplier only realized this when they began studying the data to understand the impact of this customer loss. Based on the facts, the plastics company decided to let this customer go without a battle and without further cutting their prices.

Even when company culture encourages fact-based decision making, recognize that facts can still be misinterpreted, misrepresented, or buried. Experts in decision making describe one of the common errors in decision making as the “confirming evidence trap.”⁴ The confirming evidence trap causes decision makers to seek information that supports a decision they have already made (by gut or intuition or personal agenda) and to ignore facts that may contradict that decision. In the case of the plastics packaging company, the analysis of the customer profitability was specifically performed by someone who did not have a personal or long-term relationship with the customer. During the analysis, there were lively debates about how much fixed and overhead cost should really be allocated to the customer; any underallocation would make retaining the customer seemingly more attractive.

- Besides fact-based decision making, the second biggest cultural difference between those who are very successful with BI and those who are only moderately successful was in whether the survey respondent saw their company as being a lean, efficiently operated one. The survey showed that 79% of successful BI companies see themselves as lean, whereas only 63% of moderately successful BI companies see themselves as lean, and 47% of the failures describe themselves as lean.

One cultural surprise to me was the degree and consistency of data hoarding. Among the failures and very successful BI companies alike, there was not a major difference in whether respondents felt access to data at their company was overly controlled or that executives fear workers know too much (see Figure 13-2, Access to Data chart). The majority of respondents disagreed with this statement; in other words, the majority of respondents said access to data is appropriately controlled (69% on average). Nevertheless, though, information hoarding is often cited as a barrier to BI success. While not in the majority, 31% of survey respondents said access to data is overly controlled, suggesting a sizable problem. In hindsight, I also think this survey question could have been framed without attributing the source of the problem to executive control. Information hoarding has also been cited as a problem among power users and other information workers for job protection issues. At Corporate Express, Walter Scott, vice president of marketing, explains, “Some departments don’t like the data being exposed. The attitude is ‘get out of my sandbox.’ If other people can see pricing discrepancies, for example, then the pricing department fears that others may see they are not doing a good job, which can make the BI team unpopular.”

Consultants and hybrid business/IT people were more likely to agree with the assessment that data access is overly controlled than were businesspeople and corporate IT professionals. There were no major differences in these averages based on the size of the company.

Promoting Your BI Capabilities

With business intelligence, there is often the attitude of “build it and they will come.” And yet, the *Field of Dreams* notion does not apply to business intelligence: you can build it, and users won’t come. There are

FlightStats, for example, initially used the tagline “FlightStats transforms information into travel intelligence.” As summer 2007 became one of the worst on record for on-time performance and flight cancellations, they creatively promoted a new tagline: “When the travel gets tough, the tough fly smarter.” Emergency Medical Associates uses “the premier on demand reporting and analytics tool for your Emergency Department” as its tagline for their BI solution. A New Jersey school district uses the tagline “data drives instruction.”

Naming Your BI Solution

In promoting your BI solution, you may refer to it by using the BI vendor tool name or with a unique name. The benefit of including the vendor-provided name is that you can leverage some of the vendor's marketing efforts. The downside is if the vendor changes product names (frequent in an industry where mergers and acquisitions abound), then you may have to change your internal product name as well. If you are suffering from a stalled implementation or if there were negative impressions early in the implementation, change the name. Corporate Express, for example, actively moved away from a vendor-specific name to Apollo. As part of the renewed BI effort, the project team held a contest to see who could think of the most appropriate name. To encourage creativity and participation, the person submitting the winning name won an iPod. Apollo, the Greek god of truth, was selected over other entries such as Moose and Infobahn.⁸ When you develop your own BI product name, be sure to consider the acronym created. If it is a global deployment, take into account the cultural impact of acronyms. Table 13-3 lists the BI product names used at Successful BI Case Studies.

Following are some other clever product names:

- **WISDOM** Web Intelligence Supporting Decisions, from Owens & Minor. WISDOM Gold is an enhanced extranet version.
- **OASIS** Online Analysis Sales Information System.
- **Honeycomb** Used by Burt's Bees to brand information accessed via BusinessObjects XI. A tagline displayed in the BI portal, “A Bee's Eye View,” also conveys the message that this information helps the “worker bees” in the company.
- **YODA** Your On-line Data Access.

Promotional Media

In promoting your BI application, you must repeat your message often and use a variety of media. Remember, the goal with promotion is to move

Training will receive a reasonable amount of consideration early in the BI process, but it seems to fall by the wayside as BI usage expands and new capabilities are delivered. One of the successful BI case studies expressed concern. “Early on, we were committed to training, but then as the demands grew to build more capabilities, the BI team has gotten pulled into more development and less training.” In this regard, recognize that training is an ongoing service and requirement that needs to be separated from the development team. The development team may still deliver initial training as part of a new capability, but at some point, consideration must be given to delivering ongoing training.

A Picture Is Worth a Thousand Numbers

Many of the successful BI case studies make much better use of visualizations than other companies I have worked with. This conclusion is not based on any statistical data, it's simply an observation. When I asked to see sample screen shots of how the case study companies were using business intelligence, rarely did I get a dense page of numbers. Instead, I would see reports and dashboards with charts, trend lines, arrow indicators, and greater use of conditional formatting (green to communicate good performance and red to indicate a problem). Visualization expert Edward Tufte suggests that a tabular display of numbers is better when 20 numbers or fewer are involved. And yet, I look at the reams and reams of reports with thousands of numbers. In truth, sometimes you do need a precise number—you want the part number, the customer phone number, the charge on your credit card bill. But when you are trying to uncover patterns, anomalies, and opportunities, a dense page of numbers is useless. All too often, it seems report developers first try to re-create a report as it existed in a legacy system (that may lack graphing capabilities). This approach may be a necessary first step to build confidence in the data coming from the BI solution, but it should not be the last. Instead, BI experts should better leverage the visualization capabilities within BI tools to more effectively communicate the data. All too often, longtime business query users will declare, “I never even knew the BI tool could create graphs!” Instead, data is either left as a dense page of numbers or routinely pulled into spreadsheets for graphing. This suggests that the problem lies in both inadequate training and lack of awareness on how best to communicate data.

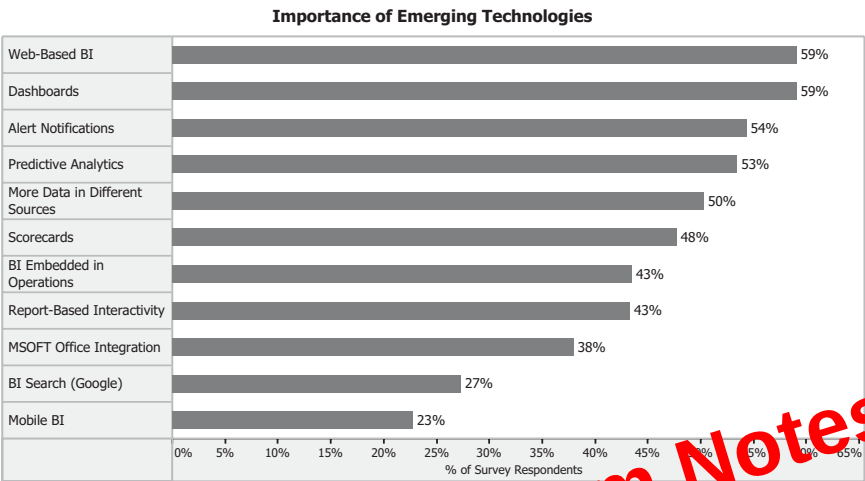


Figure 14-1 The majority of survey respondents believe web-based BI, dashboards, alerting, and predictive analytics will allow greater success. (Results based on 513 responses.)

are considered most important in helping companies achieve greater success. Web-based business intelligence and dashboards were rated the highest, with predictive analytics and alerting also at the top. Surprising to me, Microsoft Office Integration, BI Search, and Mobile BI were selected by only a small percentage of survey respondents.

The view according to business users, however, is slightly different, as shown in Figure 14-2. Business users account for only 10% of the survey respondents. Those who describe themselves as hybrid business-IT personnel account for 23% of respondents. I have specifically excluded IT personnel and hybrids from Figure 14-2, to show the gap in perceived importance of certain technologies. When viewing responses only for business users, the importance of Microsoft Office integration moves to the top of the list, while alerting moves down.

Some of these differences can be explained by gaps in understanding of the feature benefits, but also by a respondent's point of view. For example, IT professionals have been burned in the past by the thousands of disconnected spreadsheets and the ensuing data chaos. As Microsoft Office integration with BI has improved dramatically in 2007, IT professionals may not realize that spreadsheet-based analysis can now be "safely" enabled and can be something to be embraced for knowledge workers familiar not just with Microsoft Excel, but also with Word, Outlook, and PowerPoint. In a similar fashion, if you are a BlackBerry user, you may rate Mobile BI high. While web-based business intelligence may have been introduced in the late 1990s, these solutions only

The subsequent sections describe these capabilities that have not otherwise been addressed in Chapters 2 and 3.

Predicting the Future

Data mining, statistical analysis, and predictive analytics are nothing new. These technologies are well established and are used in a number of different applications such as fraud detection, customer scoring, risk analysis, and campaign management. What's changed is how they have become integrated in the BI platform. Traditionally, predictive analytics has been a backroom task performed by a limited few statisticians who would take a snapshot of the data (either from a data warehouse or from a purpose-built extract from the source system), build a model, test a model, finalize it, and then somehow disseminate the results. While the expertise to build such models remains a unique skill set, the industry recognizes that the results of the analysis should be more broadly shared, not as a standalone application, but, rather, as an integral part of the BI solution. This does not mean that predictive analytics software will become “mainstream,” but rather that the results of such analyses can be readily incorporated into everyday reports and decision making. The analysis, then, is what needs to become mainstream.

Predictive analytic tools from different vendors do continue to differ significantly in how they work and in what information is stored in the database versus calculated and presented in a report or incorporated into an operational process.

At Corporate Express, for example, predictive analytics are being used to improve customers' online shopping experience.¹

Market basket analysis helps retailers understand which products sell together and provide product recommendations. In the past, Corporate Express provided these recommendations by logical product pairings. So if a customer ordered a stapler, the online store would recommend a staple remover as the marketing team had marked this as a complementary product.²

In analyzing the data, though, it turned out that what was most often purchased with a stapler was not a staple remover, but rather a ruler, tape dispenser, and a wastepaper basket—items that indicate a purchase for a new employee. With the manually associated product recommendations, there was no significant impact on sales. Leveraging MicroStrategy and SPSS, Corporate Express tested a new market basket option. The model analyzes past shopping carts and produces

and insight. With rich reportlets, someone accesses a report over the Web but in a much more interactive and appealing way. At a simple click, data can be re-sorted, filtered, or graphed, without having to launch a complicated report editor. With the use of either Adobe Flex or Macromedia Flash, these reports come to life in ways that make business intelligence fun. I have seen, for example, a bubble chart that displays bubbles dancing across the screen as the time axis marches onward. Such animation makes BI appealing as well as insightful as users see the trend in action. In this regard, the term “report” doesn’t do justice to the capability that is more akin to a mini application.

This type of interactivity affects all BI users, whether casual or power users. The appeal makes BI more engaging, and while some technologists may scoff at the importance of this, when other barriers to adoption exist, appeal matters. A lot! The ability to interact with the data in a simple and intuitive way facilitates greater insight at the hands of the decision maker. The report consumer is not forced to delay this insight until a power user can modify the report. Lastly, the cost of ownership is lowered because a single report can be “tweaked” to that decision maker’s needs, without IT having to maintain thousands of individualized reports.

The Future Beyond Technology

Technical innovation is only one aspect that will help increase BI’s prevalence. In discussing future plans with many of the case study companies, much of their concern was not about technology, but rather, in finding new ways to use BI to address common business problems. For the more large-scale deployments, some expressed concern about managing the risk of making any kind of major change to such a business critical, complex application. With success, of course, comes greater demands on the systems and the people. Ensuring an effective way of prioritizing competing requests warrants constant attention. One business leader expressed frustration at his department’s inability to make wise investments, while witnessing other departments, working in more unison and getting more value from business intelligence. Yet he remains optimistic that his business will get there and that BI will be the first thing people look at, even before email. “To have one screen I can get to with a single click, that shows sales, margin, price, opportunities in graphical form, with drill down—that would be magic!” His comments remind me that the technology is sometimes the easy part; getting the

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Appendix A

This Successful BI Survey

This Successful BI survey ran for six weeks from April 2007 until mid-May 2007. The full survey is included here. Questions that involved ranking of items used a survey feature to randomize the order of the displayed options so that results were not skewed by the order of the possible selections. The survey was promoted through multiple media outlets and elicited 515 qualified responses.

1. How do you currently use business intelligence?

- ☐ I rely on information from analysts who use BI tools directly
- ☐ I access pre-built reports and analyses
- ☐ I create my own reports and analyses
- ☐ I don't use BI at all
- ☐ Other (please specify)

If you selected other please specify:

2. How successful do you consider your current business intelligence deployment?

- ☐ Very Successful
- ☐ Moderately Successful
- ☐ Mostly a failure

3. How much has BI contributed to your company's performance?

- ☐ Significantly
- ☐ Somewhat
- ☐ Not at all

4. How do you define the success or failure for your BI deployment? (select all that apply)

- ☐ Return on investment
- ☐ User perception that it is mission critical
- ☐ Support of key stake holders
- ☐ Number of defined users
- ☐ Percentage of active users
- ☐ Cost savings
- ☐ Improved business performance
- ☐ Better access to data

Additional comments:

- ☐ MS Office integration (Excel, PowerPoint)
- ☐ Dashboards
- ☐ Predictive analytics
- ☐ Custom-built solutions
- ☐ BI Portal
- ☐ Reports distributed through e-mail
- ☐ Scorecards
- ☐ BI embedded in operational tasks
- ☐ Other (please specify)

If you selected other please specify:

19. How would you describe your company culture?

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Access to data is overly controlled, and executives fear workers know too much.	☐	☐	☐	☐	☐
Decisions are made from gut feel and not fact-based analysis.	☐	☐	☐	☐	☐
We are innovative and always looking for ways to do things better.	☐	☐	☐	☐	☐
We are a lean company that operates efficiently.	☐	☐	☐	☐	☐
We use computers and information technology to achieve competitive advantage.	☐	☐	☐	☐	☐

20. Which emerging technologies do you think will help you achieve greater success? (select all that apply)

- ☐ Web-based BI tools
- ☐ Dashboards

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