

## Business Intelligence Best Practices: Transforming Data into Information

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### Abstract:

The introduction of information technology systems decades ago helped organizations worldwide benefit from more efficient operations and greater productivity. Over the years, companies have acquired volumes of data in these applications, but much of this data is trapped in multiple, disparate systems which cannot easily communicate. As a result, firms must expend considerable effort to tap into the full potential of these data assets to strategically maneuver the business in a rapidly changing and competitive marketplace.

The latest evolution in IT is “business intelligence,” which promises to help businesses better tap into and leverage their data assets. But what, exactly, is BI? How can it help? How is it implemented? And what can it do for your company? Essentially a primer on BI, this paper describes BI, how it can help you, and best practices to consider when launching or refining a business intelligence initiative.



In today's global business climate, CIO's work at *breakneck speed* to meet their companies' competitive demands and at the same time remain savvy about the enterprise business strategy in order to drive their companies' success.

Only at this speed and with IT and the business in alignment can the technology leader enable his company to break away and get in front of the competition by a healthy stretch.

Undoubtedly, information technology has become tightly intertwined with business. Just to keep current with the breakneck speed of technological changes, many organizations have allowed IT to take the driver's seat, leaving business and business strategy to ride shotgun.

This sounds as ominous as global warming, but fortunately, businesses are recognizing that having real-time, accurate, and consistent information—not just data—can help them regain strategic control and better position their organizations to break away from the competition. In fact, there are strategies you can pursue now to make it through the seeming chaos and realize great benefits to your organization.

## Prediction: Demand for BI Capabilities Will Increase Rapidly

Gartner analysts forecast that in 2007, organizations' demands for business intelligence capabilities will increase rapidly. BI strategies and roadmaps will not only enable IT and business alignment, and provide real-time information and proof of IT value, but they will also prompt adoption of new technologies, lead to new styles of deployment and even create physical process changes for operational efficiency across the enterprise. Improving operational efficiency involves more than simply automating labor-intensive activities. It requires organizations to continually seek out new methods of managing increasingly complex business processes. By injecting business intelligence technology directly into critical business operations, companies can ensure that the right people get involved at the right time to make decisions that positively impact the bottom line.

The BI initiative is not only powerful and far-reaching, but it's also rather democratic in that it's a **top down and bottom up effort**. All organization decision-makers drive increased business performance at strategic, tactical, and organizational levels. By reaching every employee — from information worker to CEO — by adding value to every decision, and by integrating processes and promoting collaboration, BI solutions can increase the impact of all employees and the businesses they represent. This is the power of business intelligence.

## The Origins of BI

"Business" generally may be described as any profit-seeking enterprise. Our culture views "intelligence" as

capacity and aptitude in grasping truths, relationships, facts, meanings and the gathering and distribution of such information<sup>1</sup>. Relative to government, intelligence extends to information about an enemy or potential enemy (think: your competition).

In this context, business intelligence is nothing new. The term popped up in 1989, when Howard Dresner, a Research Fellow at Gartner, Inc., popularized BI as an "umbrella term to describe a set of concepts and methods to improve business decision-making by using fact-based support systems." An earlier reference to such intelligence occurs in Sun Tzu's *The Art of War*,<sup>2</sup> one of the most widely read military (and business) classics in history. Sun Tzu believed that to succeed in war, one should have full knowledge of not only one's own strengths and weaknesses, but also full knowledge of one's enemy's strengths and weaknesses. This is exactly what business intelligence helps you do. Not a bad analogy from ancient pre-IT history!

Strategy without tactics is the slowest route to victory. Tactics without strategy is the noise before defeat.

— Sun Tzu

Fast forward from ancient China to 1989 (when the BI term first appeared relative to technology) and on to today. BI on the leading edge most commonly describes the acquisition, provision, and analysis of real-time, fresh data. Customers demand a quick response and better service from businesses. Companies rely on their business intelligence systems to retain customers and stay ahead of the competition. To accomplish this, the company's users must have access to real-time information relating to their business, particularly in frontline operations. Both customers and users have come to expect up-to-date and fresh information. In today's business climate, information that is weeks or days old is not relevant or useful. Customers do not want to wait for information, and neither do business users. The information must always be available and current.

## What is BI?

Just as Sun Tzu foresaw, the intelligence we require today about ourselves (that is, our business) and our enemies (that is, our competition) focuses on collecting data, understanding the meaning in the data, and having the vision and capacity to respond to the information.

Business intelligence expands across a breadth of methodologies and tools in various categories. The methodology and tools are not nearly as important as the **vision and execution of a business intelligence strategy** for the enterprise. Thus, tools are not discussed in this paper. However, to organize thought around what comprises business intelligence, some examples follow, categorized into **Data Collection** (the gathering of data), **Information** (transformation of data to understand its meaning), and **Vision** (the capacity, governance, and process to do something with the information). These examples are not by any means all encompassing, but are provided to demonstrate BI's scope. Note that some items cover more than one category.

### Collecting Data

- Executive Information Systems
- Enterprise Management Systems
- Management Information Systems
- Portals
- Dashboards
- Scorecarding
- Online Analytical Processing (OLAP)
- Multidimensional Analysis
- Analytics
- Data Warehousing
- Document Warehousing/Management
- Supply Chain Management/Demand Chain Management
- Web Personalization and Web Mining
- Text Mining
- Service Monitoring
- Service Mining
- Configuration Management

### Information

- Metrics
- Business Activity Monitoring
- Business Performance Measurement
- Finance and Budgeting
- Mapping
- Business Alignment
- Business Performance Management
- Business Planning
- Business Process Re-engineering
- Competitive Analysis and Competitive Landscape
- External Knowledge
- Customer Knowledge
- Customer Loyalty

- Customer Relationship Management
- Data Farming
- Geographic Information Systems

### Vision

- Real-Time Business Intelligence
- User/End-User Query and Reporting
- Associative Query Logic
- Web Personalization and Web Mining
- Text Mining
- Information Visualization
- Customer Relationship Management
- Data Mining
- Data Farming
- Decision Support and Forecasting
- Human Resources
- Knowledge Management
- Statistics and Technical Data Analysis
- Trend Analysis

## The BI Pyramid

Figure 1 demonstrates the framework, or logical architecture, of business intelligence. Each level of the pyramid is summarized here, and described more fully in the rest of this white paper.

**Sponsorship:** The foundation of a solid business intelligence initiative begins with executive sponsorship which is committed to the BI strategy and implementation. It also includes organizational willingness and an assessment of the organization's readiness. Without all three of these elements, the foundation will be unable to support a successful BI initiative.

**Architecture:** Once executive sponsorship, organizational willingness, and a readiness assessment have been achieved, you can move up the pyramid to the next level. Sitting on top of the foundation are integration architecture, data governance, and data. At this stage, the organization's IT architecture must be examined and integrated so data is shared among systems. Data must be examined, and a data governance program initiated to direct the use of and access to data, and to verify its accuracy, consistency, and reliability. (To learn more about data governance, refer to our white paper titled "The 7 Stages of Highly Effective Data Governance: Advanced Methodologies for Implementation" at [www.ciber.com/downloads/whitepapers](http://www.ciber.com/downloads/whitepapers))

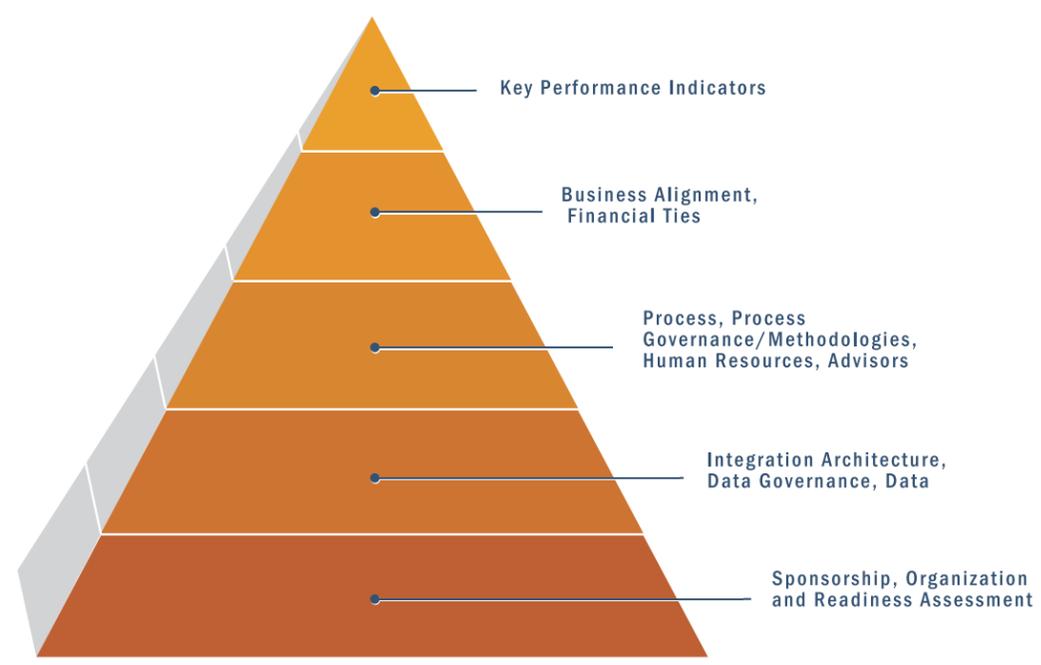


Figure 1: The Business Intelligence Pyramid

**Process:** Processes and methodologies must be developed to govern the organization’s on-going business intelligence efforts. These processes ensure a consistent approach to BI as new IT systems are integrated and as new team members join the organization. As the BI efforts grow, a permanent BI position(s) may become necessary to further the BI rollout. Human Resources may need to become involved to understand the skills and talents needed for the role(s) to help fill the position.

**Alignment:** As the organization delves deeper into the BI effort (and note that this is an iterative process), IT resources will become more aligned with business objectives. In addition, financial information will be better integrated and more easily accessible to authorized personnel. This integration provides information—as opposed to data—that supports decisions and guides actions to drive your organization to greater competitiveness, flexibility, and profitability.

**Key Performance Indicators:** Key performance indicators (KPIs) provide the right metrics for business performance management. They tell you how well you are doing, and where you can improve. A Harvard Busi-

ness Review article reports that only 23% of Fortune 1000 companies have KPIs that are accurately tied to business strategy and financial results. This group earned almost 3% higher return on assets and more than 5% higher return on equity than the companies with inaccurately correlated metrics and strategy.<sup>3</sup>

KPIs can help you evaluate your organization’s BI readiness by illustrating the relationships, business activities, operational performance, and financial results. How many KPIs do you need? More than one, but not more than six. When working with KPIs, more is not necessarily better. However, it’s important that you monitor the best KPIs for your organization—only the right business metrics will enable execution of a BI strategy and transformation of data into information, leading toward greater strategic vision.

So how do you identify the best KPIs for your organization? There are many ways. What’s more important than *how* you develop them is *that* you develop them. And keep in mind that 2 to 6 KPIs is the best number. More than 6 are hard to monitor, or are redundant. To create or refine your KPI, you may look at the metrics

that the business needs to measure at each level: project, business unit, and enterprise. Each level of metric must feed the enterprise KPI. Remember, only a few KPIs are needed per level, as these will roll up to link KPIs across departmental silos.

BI uses metrics from these KPIs to assess the present state of business and to prescribe a course of action. Think of the KPI as the lifeblood of your BI strategy. Analysis of KPIs will always tell you where you are in the BI strategy and in using BI for better business. As a result of BI, more organizations have started to make more data available more promptly. In the past, data only became available after a month or two, which did not help managers adjust activities in time to hit targets. Metrics analysis may include both internal efficiency and external state intelligence, such as goal alignment queries, baseline variance queries, cost and risk queries, customer and stakeholder queries and methodology measurement-related queries.

*If you don’t know your past, you don’t know your future.*

—Ziggy Marley

### Supporting the BI Strategy

Between the foundation of data and the crown of key performance indicators is an architecture to support the BI strategy. Only with a robust candidate architecture which is designed to reduce complexity and cost will BI benefits be realized. The architecture will facilitate data quality and data management. It will enable enterprise integration services that transform data. It will push information to the knowledge user based on business events.

While a number of architectural models and tools support BI, two architectural concepts are most important. Service-Oriented Architecture (SOA) is paramount to simplify and manage data integration and transformation and to deliver information to the enterprise. Multiple Source Simple Output (MSSO) implemented within SOA is a server-less architecture which allows for seamless and secure data integration, taking data directly from disparate sources and pushing it out to desktop tools, providing event-driven access to live, raw data. SOA services will support associative queries and enable knowledge users to ask questions in plain text (similar to Instant Messaging). In response, knowledge users will receive from the enterprise data

from many sources—data which has been transformed into reliable, real-time information.

The architectures to serve BI will drive out complexity and chaos for data stored everywhere in the enterprise. Consider the architecture as the primary simplification approach, which simplifies infrastructure through SOA to enable flexibility, reuse of code, and greater ability to more efficiently manage applications. While newer architectures like MSSO can advance the BI strategy, SOA is the mature framework for BI. SOA has been around for a long time, and has enabled companies to share logic and data among multiple applications and usage models. However, only 27% of large organizations and 17% of mid-size organizations have deployed SOA within their enterprises.<sup>4</sup>

The implication of real-time information pushes architectural innovation to the forefront. Earlier BI and data mining initiatives lacked the kind of timely, current data that users now insist they require. This is because they relied on a data warehouse with the challenges of data conver-

sion and multiple, disparate data sources alongside the constantly changing business demands that require time consuming and costly modifications.

Only with architectural and technological advancement—such as SOA and MSSO—can we move beyond data which is modeled and transformed in the traditional way. These advancements enable real-time business intelligence. The focus shifts from databases and the challenges in data structure to architectures that enable real-time data capture and immediate transformation into information. The evolutionary shift in BI to attain real-time information pushes MSSO and SOA into the BI vision.

### Evolving BI To Your Company’s Advantage

First, take stock of where you are in your maturity along the BI evolutionary path. Then establish and review your KPI. Are they relevant and meet the best practices criteria described in this paper?

Finally, use your KPIs to address the underlying BI architecture to:

- Establish and strengthen the BI vision
- Create consistent governance to gather, understand and act upon the information
- Enable continual process improvement to intertwine business and IT strategies
- Determine the physical process changes that your BI knowledge workers must undergo in order to gather, understand and act
- Lead both IT and BI knowledge workers to higher performance with their newfound information
- Use the BI knowledge to manage IT and business risk within the enterprise
- Review and communicate your performance against KPI
- Advance BI strategy through KPI results, determine your own best practices, and make intelligent adjustments to your business

Once you understand your organization's BI readiness and maturity, you can advance your BI efforts by establishing robust, relevant KPIs, and then managing to them. KPIs can help the enterprise make real-time adjustments to business direction. This, in turn, impacts operations and improves the metrics in the company's most important business processes. In short, KPIs help you monitor, capture, analyze, and report on critical key events the moment those events occur.<sup>5</sup>

Configuration management is an example of BI execution at the project or unit level that enables simplification in place of complexity. Configuration management tells you about your past and your present. You must know this to create a vision of the future. Monitoring configuration management and IT services through KPIs enables managed services to align with agreed-upon service level agreements and customer commitments.

Leverage BI strategy and KPIs for change management with people. Although enterprise financial metrics are well-rationalized and administered by the CFO, performance metrics often are not. These performance metrics often become siloed in the functional activities being measured, and can be the basis

for incentive-based compensation plans for mid-level, functional managers. If they are the wrong metrics, you will suffer from discontinuities in the execution of cross-functional tasks. On the other hand, **well designed** KPIs which are the basis for incentive-based compensation plans can result in goal congruence among cross-functional teams.

### BI Best Practices

A summary of top ten BI best practices follows, not necessarily in order of priority.

1. Assess and know the state of your company's business intelligence strategy, maturity and evolution, at all times.
2. Establish robust KPI as the framework to your BI strategy.
3. Data quality is the foundation, so data must be governed as to source, accuracy, quality, and speed of availability.
4. Use KPIs to tightly intertwine and align business and technology for your BI strategy.
5. Do not fret over ROI for BI—all KPI metrics, when used collectively, are leading indicators of financial performance.
6. No more than six KPIs (plus or minus a few if you must) are to be used at any given organizational level. The metrics should roll up from level to level and result in six enterprise-wide metrics.
7. Derive BI process framework from KPIs for implementing and managing BI processes with your teams across the enterprise.
8. BI strategy must be supported and made flexible by an architecture that enables data governance and the transformation of data into information, and which provides real-time access to that information.
9. Continuously monitor your BI initiative to ensure that objectives are being met. The BI strategy will evolve and develop over time as your strategies and initiatives mature.
10. Focus on data structures that are easily adaptable to the changing business landscape.

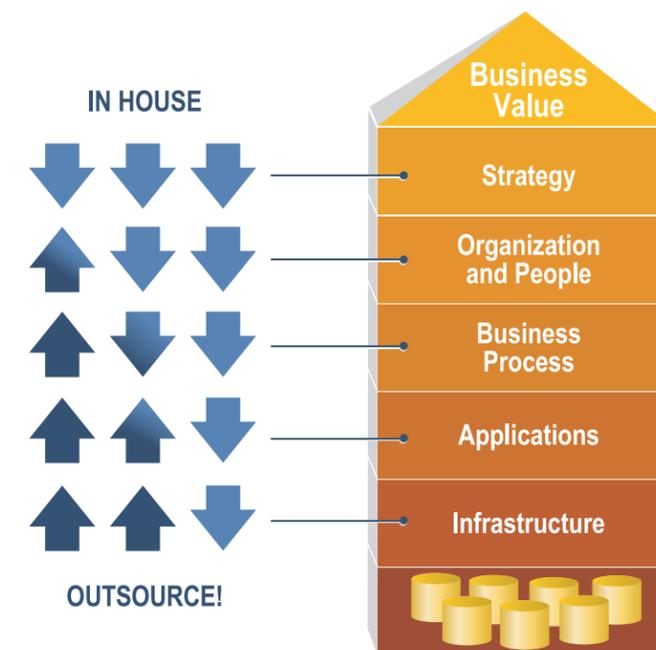


Figure 2: Outsourcing Business Intelligence Initiatives

### Advancing BI in Your Enterprise

Wherever technology is falling short of aiding users in reaching business goals, wherever front-line users lack access to real-time information to solve problems, or wherever you lack information governance that exposes the right data—these are opportunities to advance BI within your company.

Corporate users express real doubts about the quality and reliability of the data at their companies, and, in many cases, they are not able to get the information they need to do their jobs.<sup>5</sup> Ineffective information governance renders corporate data largely useless and is sure to affect productivity and profits. Remember that information is data in context and to be in context, it must often be current, real-time or near real-time.

### Outsourcing BI?

The business buyers in your organization are proving to be pragmatic and knowledgeable of what they

want and need, and they have realistic expectations of outside consultants, advisors, and expertise. Likewise, the CIO is business-focused and results-oriented, and often wants to be involved in and critical to problem resolutions. But for both groups, resources are limited.<sup>6</sup>

In situations where resources are scarce, outside consulting services can be helpful in solving specific, “bounded” problems, such as building infrastructure and applications, and assisting with business process re-engineering. Figure 2 shows how a BI initiative can be managed from both a top down (i.e., in-house) and bottom up (i.e., outside services) approach, to save time and money. The hardest part is evaluating and choosing the right BI partner. BI initiatives are vastly different from many past IT initiatives in which outside services have been retained, so it's important to consider more than just cost and/or staff augmentation abilities when evaluating a partner. For BI initiatives, what will serve you best is a partner with proven capability, reputation, and track record of success.

It's also critical to keep in mind that outside consultants cannot establish your KPIs for you, determine your BI strategy and vision, or be accountable for process changes within your user workforce. They can, however, use KPIs and strategy to provide solutions to specific BI activities, such as data governance, data architecture, and data transformation.

Your objective in hiring an outside advisor is to identify a partner who can understand and align with your strategy, take a business-driven approach, and support the execution of specific initiatives to meet your vision.

Once you've implemented your business intelligence initiative, you'll be able to use all of the information at your fingertips to monitor performance, track the marketplace, adjust business direction, and plan for future changes. In short, BI will help you achieve and even exceed your goals to break away from the competition, and you'll wonder how you ever got along without it.

## Notes

<sup>1</sup> Dictionary.com Unabridged (v 1.0.1). Retrieved December 05, 2006, from Dictionary.com website <http://dictionary.reference.com>

<sup>2</sup> The Art of War, by Antoine Henri De Jomini, translated from Chinese in 1910

<sup>3</sup> Harvard Business Review (HBR) "Coming Up Short on Non-Financial Performance Measures," by Dr. David Larcker, Nov. 2003

<sup>4</sup> "Smooth Sailing in Successful SOA," Jessica Yi, Business Trends Quarterly, Oct. 2006

<sup>5</sup> Actual examples of real time BI are described in the book "The New CIO Leader: Setting the Agenda and Delivering Results" by Broadbent and Kitzis, 2005, Harvard Business School Press.

<sup>6</sup> CIO Insight, "May 2006 Information Management Survey: CIO's Struggle to Generate Full Value from Their Information," by Alan Alter

## About the Author



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