DELIVERING BUSINESS INTELLIGENCE
WITH OPEN SOURCE SOFTWARE

INGRES

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ABOUT THE AUTHOR

Chip Nickolett is the Director of Consulting Services for the Americas at Ingres. He has over 22 years of business and IT experience, and he has been performing and managing consulting efforts at companies large and small since 1993. Previously, he started and managed consulting businesses in the US and UK, and he understands the importance of aligning technology with business strategy. Chip holds an MBA degree from Keller Graduate School of Management.

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"Spreadsheet Warriors, born 20 years ago and effective small-scale business analysts throughout the '90's, are finding it increasingly difficult to operate in today's complex, global environment with the proliferation of data sources and analytic demands. A formal focus on Business Intelligence (BI) and BI platforms is the logical progression for those wanting to improve business performance."

Steve Miller, Business Intelligence Journalist

Preface

The business environment has changed for everyone since the mid-1990s. The widespread use of the Internet means that competition now often comes from companies halfway across the world having access to cheaper resources. A company's value proposition is more than just their price, but price has become far more of a focus. In order to survive in this competitive environment a company needs to operate in a lean yet effective manner and employ a strategy of continuous improvement.

Most successful companies use a performance management system to ensure the effectiveness of their business strategy, and the balanced scorecard system has emerged as powerful tool in the drive for competitive advantage. The main elements of a balanced scorecard based management system are:

• Balanced Scorecards to measure business performance

• Business Optimization actions driven by scorecard metrics

• Business Intelligence to provide the supporting information.

Implementing the IT systems to support this approach can, however, be challenging and expensive. The emergence of industrial strength open source software solutions offers more cost effective options, but careful assessment of the products and suppliers is essential.

Balanced Scorecards

Robert Kaplan and David Norton developed the concept of balanced scorecards and described them in a series of articles in the Harvard Business Review (www.hbr.com). Their approach translates business strategy into Key Performance Indicators (KPIs) – thereby linking long-term strategy with short-term performance. The mix of financial and non-financial measures is what makes the scorecard "balanced."

Balanced scorecards provide a realistic and objective method of measuring a company's performance in key areas. They are used to help evolve business strategy, monitor performance and measure the effects of business optimization initiatives.

There are two main components of balanced scorecards. The first is identification of measures and priorities that are linked to the overall business strategy. For example, if your company feels that customer service is a key differentiator between itself and the competition, then what indicators identify good customer service? Some may be obvious (such as customer satisfaction ratings), while others are subtle and may seem indirect (the effect on customer retention of customer support events).

Identifying measures that relate to the key objectives of the business and then validating those relationship assumptions is very important. Limiting the overall number of measures per area (four to six key measures are typical) helps make the process more manageable and effective.

The second component is mapping specific measures to individuals or groups who have the ability to influence their outcome. For example, the Information Technology (IT) Department can impact the customer experience through the performance and availability of the systems supporting the customer service representatives, but an accountant might not be able to directly affect the quality of customer service.
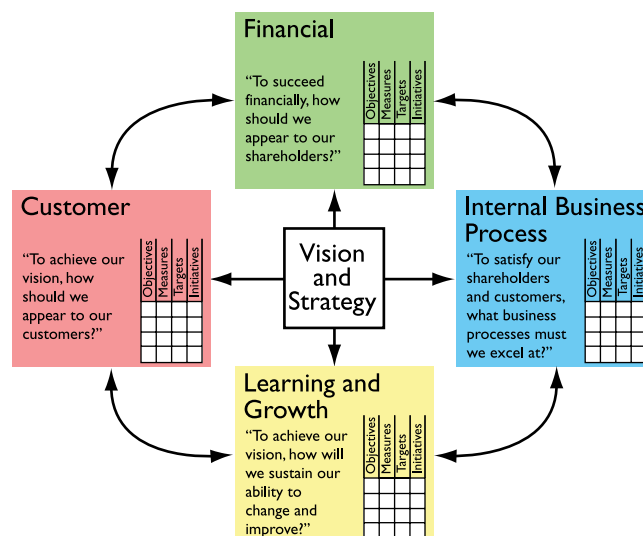

Diagram 1:
The Balanced Scorecard
Process
(Source: The Balanced
Scorecard Institute –
www.balancedscorecard.org)

Each person or group needs to understand how their measures relate to the overall strategy, how they are empowered to control each measure, and how performance of this measure impacts them directly. Compensation that is associated with performance can have a powerful impact when properly implemented ("before the common good can be realized, individuals must have some motivation for contributing to it." – statements about the Economic Theory of Group Behavior from "Microeconomics for MBAs" (page 137) by Richard B. McKenzie and Dwight R. Lee). This cause and effect linkage is a compelling motivator for staff and promotes good stewardship of business processes.

The extensive adoption of balanced scorecards by companies confirms the value of this technique. Accurate, comprehensive and timely business information is crucial to the implementation of the methodology. KPIs must be updated regularly in order to be useful and the individuals responsible for them need insight into all the factors contributing to their performance.

Business Optimization

This is the execution component of the business strategy. The results of the measures, or KPIs, from the balanced scorecards are telling a story. For many businesses it is important to correlate the KPIs with outside events – this is known as "benchmarking." These events can include the stock market, energy prices, the rate of inflation, the value of the Dollar relative to a foreign currency, and even a competitors' stock price. This view of the "big picture" provides the basis for improvement, or optimization, of the business.

The management team needs to understand how to "read" the story, and then make changes and adjustments to achieve the desired result. The impact of change is usually not immediate, so analysis of trends is important. Making the right amount of correction, and making that correction at the right time, can be difficult. Using the right representative measures and having accurate and current information is essential for effective business optimization.

In addition, there are often complex relationships in the data. In the best scenario there will be a direct cause and effect relationship that makes identification of possible changes easier.

However, in most cases it will be far more challenging to correlate the data, identify the trends, and isolate the anomalies that provide insight into business performance.

The initial review of the data leads to the next step, which is to perform a deeper "drill down" analysis for a more detailed understanding. That understanding forms the basis for action. It is important that any changes made are monitored to confirm that they have the intended effect. Accurate, timely information supports the analysis that leads to change. Strategic changes, supported by knowledge derived from accurate and timely information, are the basis of business optimization.

Ultimately, business performance is about leverage. How much you can accomplish with every dollar spent or invested? An efficient business has more leverage than an inefficient business. Leverage allows a business to do more for less. This can take the form of expansion into new markets, investing in R&D, and the maximization of profits while maintaining a competitive position in the marketplace. Business optimization helps increase leverage by using KPIs to focus performance improvement efforts on the areas that matter.

Business Intelligence (BI)

Business Intelligence is the use of validated, fact-based information, together with analytical and reporting tools, to support or enhance the decision making process for business optimization. A well-developed BI system will provide "at a glance" review capabilities that make it easy to quickly review KPIs and "drill down" into the data for detailed analysis where an anomaly, exception, or trend appears.

BI systems typically support in-depth statistical analysis, forecasting, predictive analysis and correlation analysis. These tools can define and test business scenarios as input to the decision making process. There are many products that provide BI support, each with differing capabilities and a different look and feel. The primary consideration is that the products selected support the type of analysis that your business is planning to implement.

Every business is different, each having its own strategy for success and growth. The KPIs will vary from department to department, or even from person to person. But there are several key attributes common to all good BI systems:

- They provide empowerment by providing a comprehensive understanding of the business environment for areas that managers can affect or control. This understanding of their "link" in the "value chain" can also be a source of new ideas for efficiency and effectiveness that can lead to simplified operations and other improvements.

- They improve overall business performance, through business optimization, relative to the defined business strategy. Scenario-based "what if" testing and predictive analysis are powerful analytical tools that can relate targeted changes to an anticipated outcome. When tied to specific measures related to the business strategy they provide focus on the changes that will have the most impact to an organization.

- They provide timely information and feedback that allow changes to be defined and implemented in the period being measured.

- They provide dashboards that deliver messages to remind the viewer of the specific strategy being pursued by the organization. It is easier to achieve goals when there is a frequent reminder of the goal or strategy.

A well-designed business intelligence platform has the potential to add enormous value to any organization that is committed to remaining competitive in a global business environment. It can provide different views of the business – operational, tactical, or strategic – based on the needs of the specific user. This knowledge can provide insight into what is working and what needs to be improved within the context of the overall business strategy.

"The goal of forecasting is not to predict the future but to tell you what you need to know to take meaningful action in the present."

Paul Saffo, Author of "Six Rules for Effective Forecasting"
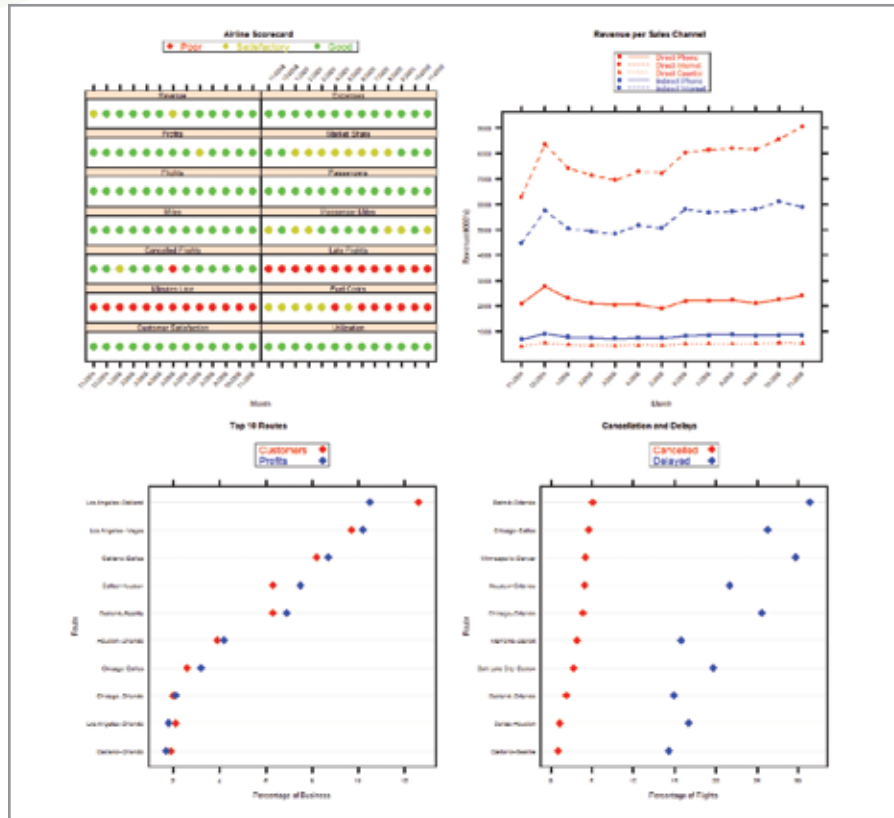Source: Harvard Business Review, July-August 2007 (page 122)

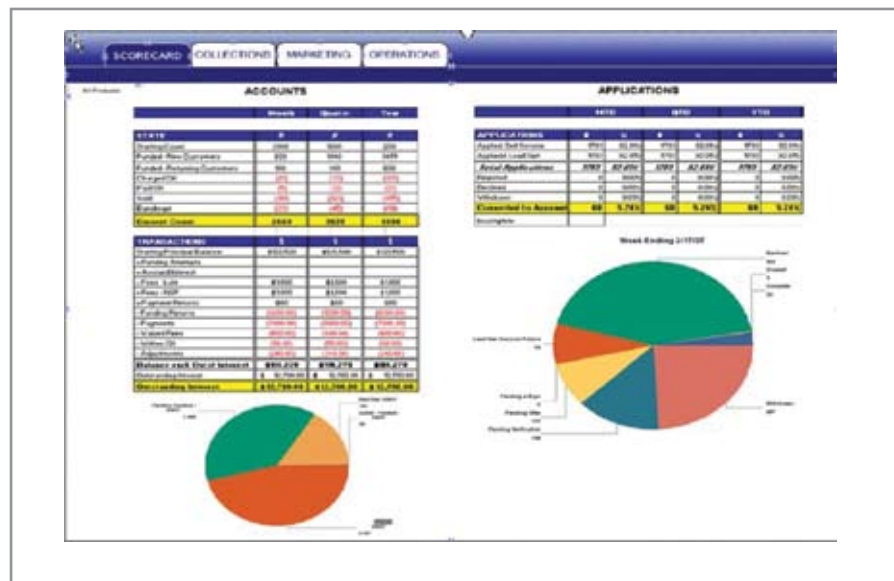Diagram 2: Sample BI dashboard. Image courtesy of OpenBI (www.OpenBI.com)

Diagram 3: Sample BI dashboard. Image courtesy of Optwize (www.Optwize.com)

The Challenges of Implementing BI

The benefits delivered by a well-designed BI system are compelling, so why is BI not more widely deployed? There are two distinct but related challenges to implementing BI that have inhibited adoption by small and medium sized enterprises (SMEs), and limited its reach in larger corporations.

Firstly, BI is technically demanding and requires a highly optimized, tightly integrated software infrastructure that includes operating system, advanced database technology, data integration middleware, analytics and reporting software. The large datasets, complex queries, and performance issues involved make successful implementation particularly dependent on specialized knowledge and selection of the right components.

The second barrier is the historical high cost of BI systems. Advanced technology is required and traditional BI systems have been designed for large corporations with large budgets. This has resulted in large, complex solutions that are expensive to buy and maintain.

New options are, however, becoming available for the provision of BI technology. Open Source software components for all BI functions are now widely available and deliver the level of usability, capability and robustness needed for business critical operations.

The Open Source Option

The open source approach greatly reduces the cost of BI adoption without compromising on functionality or the quality of support available. The lack of license fees means that companies can take a pragmatic approach to deployment, trying out products without making a major financial commitment and without fear of vendor lock-in.

Organizations new to BI can take low risk, incremental steps, developing their skills in the process. More experienced companies with existing implementations can affordably extend BI to new areas of the business, with the option of combining open source components with reporting tools familiar to their users.

A less well understood advantage of the open source development process is the usability it promotes through close interaction with the user community. Solutions to complex technical challenges are readily shared and continuous peer review by a wide audience ensures quality and ease of use.

Open Source software has reached a level of maturity where it is confidently employed by organizations for business critical operations such as BI. The Linux operating system, for example, can be found in data centers worldwide, and provides all the scalability, reliability and hardware support needed for enterprise systems.

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The most crucial technology component in a BI solution is, however, the relational database. Because the requirements of complex data analysis are so demanding, only the most advanced database products have the features, performance and robustness for this application. When reviewing the options for open source databases, the following requirements should be considered. Robustness – the reliance of the business on timely reporting, plus the effort required to create the large datasets involved means that the database must always be available and data integrity never compromised. A robust database has the following attributes:

- A proven track record of successful operation in business critical situations, especially large BI solutions

- Transaction journaling, which preserves data integrity by enabling data recovery in the event of hardware faults

- The ability to reliably back up and restore data using online and offline storage.

High performance with scalability – large and complex BI queries are particularly demanding on database performance. The ability to execute conventional transactions quickly is no guarantee of performance when querying very large tables. Key technologies that are necessary for performance at scale are: can be found in data centers worldwide, and provides all the scalability, reliability and hardware support needed for enterprise systems.

- Partitioning, which enables large tables to be divided into sections in order to optimize searching

- Parallel query processing to exploit the multi-processor architectures of high performance servers

- Intelligent optimization of queries through the generation of execution plans based on database statistics

- Scalability, the ability to run unchanged on a wide variety of platforms, from single processor workstations to large, massively parallel enterprise servers. In addition to these crucial features, the ideal open source platform for BI will have all the flexibility and breadth of the most advanced database products available including:

- Distributed processing capability

- Support for key software standards such as XML and Unicode

- Full internationalization and localization capability

- Support for the latest development environments such as Eclipse.

Highly functional data analytics and reporting software is also available in open source form, enabling a complete, end-to-end solution to be created. It is, nevertheless, important that any open database selected has proven implementations with the major BI applications in order to provide maximum flexibility for the business.

Although the right choice of technology is vital to a BI venture, success depends as much on the service and support capability of the supplier. Open source has the considerable benefit of user community support, but the ability of the supplier to provide comprehensive integration services and global, 24X7 commercial quality support is also essential.

In Summary

Identifying opportunities to eliminate or mitigate risk while increasing productivity and profitability are key aspects to managing a competitive business venture. Maximizing performance and minimizing waste are important goals that can be achieved at all levels of a business.

Balanced Scorecards can provide visibility into efforts that lead to Business Optimization, all of which can be managed and monitored by a Business Intelligence System. This is an area where technology aligns with business in a way that adds strategic value, often resulting in efforts that create a competitive advantage for that business. In an increasingly competitive global market, even the smallest advantage can have a big impact.

The high cost and complexity of the enabling BI technical infrastructure has inhibited adoption for many companies, but the advent of fully functional, usable and industrial strength Open Source solutions has made BI much more accessible. Rigorous selection criteria must, however, be employed when choosing the technology platform, and the supplier, for this demanding application.

Highly functional data analytics and reporting software is also available in open source form, enabling a complete, end-to-end solution to be created.

The companies behind the BI Examples

OpenBI is focused on deploying and implementing open source business intelligence (OSBI) solutions. OpenBI helps clients bring actionable intelligence to their business strategies and operations through best practice data warehouse integration, analytics, and performance management services. The resulting solutions help improve business performance by harnessing organizations' enterprise data with focus on both operational decision management and strategic performance measurement. OpenBI's approach is structured to fit existing organizational needs, capabilities, and IT investments.

Optwize has created the WiZeBI™ Financial Services solution set, founded on Ingres' Icebreaker BI Appliance. It is an "industry first," turnkey, out-of-the-box Business Intelligence product designed for the financial services sector. Residing on top of the Ingres appliance, WiZeBI contains a complete set of BI applications that financial managers can customize and use without IT intervention.

Ingres provides an industry leading, fully featured, enterprise class open source database benefiting from over 20 years of development and deployment in business critical environments. The advanced Ingres database has been integrated with the Linux operating system and Jaspersoft's advanced BI software to create the highly optimized Ingres Icebreaker BI Appliance. Jaspersoft is the market leader in open source BI software with more than 6,000 commercial customers in 81 countries. The Jaspersoft Business Intelligence Suite comprises an interactive reporting server, an OLAP server for information analysis and a comprehensive set of data integration tools.

About Ingres Corporation

Ingres Corporation is a leading provider of open source database management software. Built on over 25 years of technology investment, Ingres is a leader in software and service innovation, providing the enterprise with proven reliability combined with the value and flexibility of open source. The company's partnerships with leading open source providers further enhance the Ingres value proposition. Ingres has major development, sales and support centers throughout the world, supporting thousands of customers in the United States and internationally.

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