



Leveraging the Foundations of Wisdom: **The Financial Impact of Business Analytics**

White Paper

White Paper

The Financial Impact of Business Analytics

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Introduction

Promoting decision making for effective action is what business analytics is all about. Analytic applications are focused on business process improvement, guiding users on a recommended series of steps for making a specific type of decision. The expected result is better decisions and increased business performance. However, before investing in a business analytics project there are important questions to be answered: Are the anticipated objectives being realized? What must organizations do to be successful? Do these applications provide a positive financial return to meet the demanding hurdles all technology investments must meet today?

This is where our study begins. *The Financial Impact of Business Analytics* is a comprehensive examination of the return on investment (ROI) for analytic applications. After visiting 43 organizations at locations ranging from Seattle to Copenhagen, the message is clear: businesses that make an investment in analytics can achieve a significant and rapid return because of increased efficiencies and expanded opportunity.

The Study

This white paper is a summary of the major findings of IDC's *The Financial Impact of Business Analytics* study based on 43 case studies of organizations that successfully implement and utilize analytic applications. In-person interviews were conducted throughout the summer of 2002. The project goal was to examine the financial impact of analytic applications on the core business processes that help contribute to an organization's success.

This approach enables IDC to examine true bottom-line results rather than theoretical costs or savings. The results accurately reflect the reality faced by decision makers who must create a pro forma evaluation of business impact when a new technology solution is implemented in an organization.

This paper consists of five main sections:

- The Financial Impact of Business Analytics
- Five Principles of High-Impact Analytics
- Key Qualitative Benefits
- Implementation Issues
- Case Study Summaries

Two companion reports are part of this study. The first, *Final Report*, provides a more detailed analysis of the results, and the second, *Case Studies*, provides a compendium of detailed case studies drawn from the extensive research IDC conducted.



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The Financial Impact of Business Analytics



Why All the Excitement?

Evidence of a narrow IT payback suggests that a large portion of America's white-collar economy has been left out of the so-called revolution of the New Economy.

— *Stephen Roach, economist, Morgan Stanley*

IDC estimates that over the next five years, companies worldwide will invest more than \$5 trillion in information technology (IT). For the past 25 years, economists have engaged in an ongoing debate about whether investments in technology have a positive impact on productivity. As Economic Nobel Laureate Robert Solow states, "You can see the computer age everywhere but in the productivity statistics."

A case in point: There is growing consensus that the white-collar benefits of technology have been limited to specific market segments. According to a recent study by McKinsey Global Institute, the incidence of productivity paybacks from massive IT investments was evident in only 31% of the private non-farm economy.

Today, spending on IT equipment and software accounts for about half of all investments by U.S.-based firms. To make a fully informed decision, executives must understand how each investment will impact the bottom line. Moreover, executives need to be assured the investment will be effectively managed to optimize returns — after all, not every company will experience the same results. Maximizing total returns requires more than adept technology management. It requires management of all aspects of organizational change, including process and productivity enhancements.

As Economist Stephen Roach states, "In the end, sustained white-collar productivity enhancement is less about breakthrough technologies and more about newfound efficiencies in the cerebral production function of the high value-added knowledge worker." This is a recurring theme throughout the study.

Aramark U.S. found a key benefit of its analytics application was the creation of well-equipped operations managers at each plant. Industrial engineers can now spend more time coaching and advising, rather than acting as line managers. Likewise, FedEx Custom Critical's analytic application allows its knowledge workers to be more proactive. According to Keith Cline, manager of financial planning and analysis for the expedited shipments division, "Overall, we are no longer reacting to old news, we are now aware of things that are going to happen next week. If it's bad, we can find a way to mitigate; if it's good, we can find a way to make it even better."

The bottom line is that a business analytics project gives knowledge workers the tools they need to be more efficient and effective, providing a foundation for dramatic changes — especially among the ranks of white-collar workers.

Analytic Application Key Findings

The range of ROI results from these business analytics projects, outlined in Figure 1, is impressive. Returns range from 17% to more than 2,000%. While 46% of the organizations generated an ROI of 100% or less, 34% generated an ROI between 101% and 1,000%, and 20% reported ROI returns of 1,000% or more (see sidebar *Why ROI?*).



Why ROI?

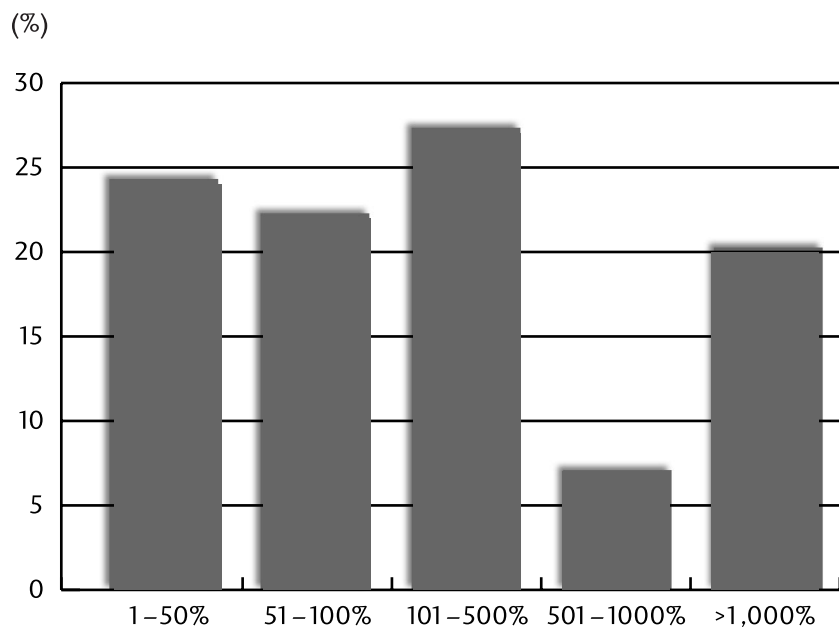
For those readers relatively new to the field of finance, or for the rest of us who are rusty, ROI is the most common method by which organizations judge the relative attractiveness of investment opportunities. At its simplest, ROI refers to the annual return on business investment. Since the expression of the results are not unlike a personal investment, such as a bank account or return on a stock investment, many people feel intuitively comfortable with this approach.

An ROI analysis begins by identifying the important business processes that have been affected by the business analytics implementation. The incremental costs and resulting benefits attributed to the business analytics implementation are then calculated over five years of use in "production" mode. To account for factors, such as inflation and interest rates, both costs are discounted and then expressed in today's dollars. This is what economists call the present value of the investment. ROI uses these present values to assess the relative attractiveness of investments. ROI can be mathematically expressed as:

$$\frac{\text{present value of benefits}}{\text{present value of costs}}$$

Imagine choosing between two projects. Project A requires an investment of \$500,000 and offers a return of \$300,000 two years from now and every year thereafter for four years. Project B requires a \$460,000 investment, but the return starts 12 months from now and delivers \$240,000 annually for the next four years. Using a discount rate of 15% and the ROI equation above, we come to the conclusion that the ROI for both projects is the same! Despite the fact that the second investment offers lower annual returns, the fact that it starts producing benefits in only 12 months has a large impact on the results.

Figure 1: Distribution of Results by ROI Category



Source: IDC, 2002

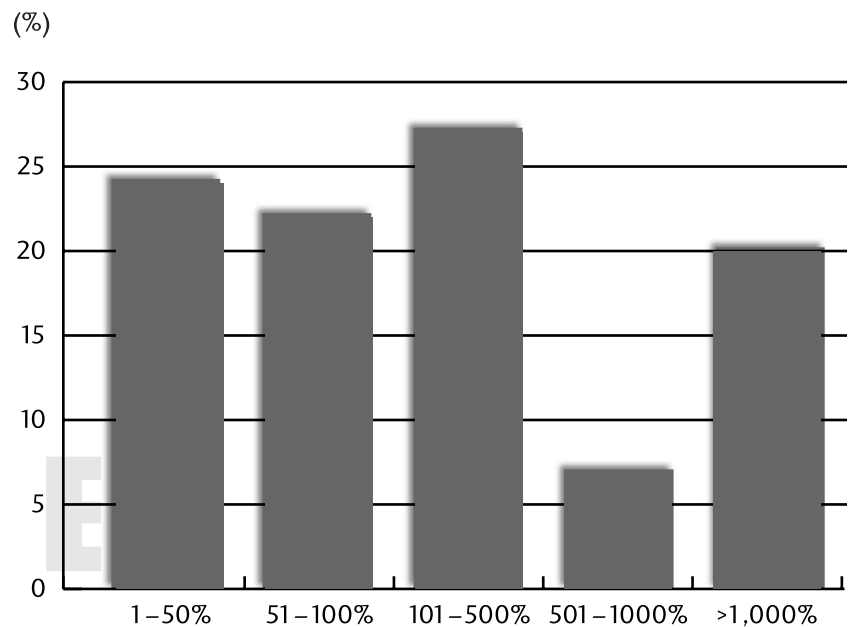
Using the payback period as the measure of success, the range of results outlined in Figure 2 is equally impressive. Payback period is another measurement often used to evaluate an investment opportunity. It measures how long it will take for a particular investment to break even. Of the 43 companies that participated in this study, 49% experienced payback in one year or less, 32% experienced payback between one to three years, and 19% experienced payback in three years or more.



Other methods of financial measurement include payback period, net present value, and internal rate of return. Each measure has its respective strengths and weaknesses as a means to assess project profitability, and each measure also has its supporters and detractors. In this summary white paper, we express returns in terms of ROI with some reference to the payback period. Payback period is defined as the amount of time it will take for the organization to recoup its investment, which is of particular interest to companies that place a high degree of importance on the amount of time it takes for an investment to yield benefits.

ROI can be heavily influenced by basic financial assumptions such as the rate of inflation in the future, the cost of money, and the degree of risk associated with the alternative investment projects. In keeping with the nature of the financial industry, we have used very conservative basic financial assumptions to calculate ROI. These assumptions, combined with a standardized data collection methodology, mean that the results are able to stand up to the most severe of financial critiques. If anything, our conservative assumptions have deflated the ROI results in this study.

Figure 2: Distribution of Results by Payback Period



Source: IDC, 2002

The Investment

The average initial investment in a business analytics project is approximately \$1.4 million. This initial investment includes the accumulation of all costs incurred before the implementation went into production at a site, including costs for building or buying the analytic application and the supporting data infrastructure. The average total cost over the first five years is estimated at \$4.5 million. The cost categories used by IDC include:

- **Services (internal).** The cost of internal full-time and part-time IT and management staff dedicated to the project.
- **Services (external).** The cost of external services, such as management consultants, that were part of the project.
- **Software licenses/maintenance.** Incremental costs associated with software licenses or maintenance, whether a primary or secondary component of the solution.
- **Hardware purchase/maintenance.** Incremental costs associated with hardware and storage.

- **Training.** Supplementary training costs from an external training provider. Includes technical training for the development staff, end-user training, and business-user training to teach decision makers how to leverage the benefits of the solution.

Over the total five-year period, the greatest proportion of total implementation cost is attributed to internal services (34%), followed by software expenditure (33%) and external services (18%).

The Return

The benefits (see sidebar *Using Survey Results*) experienced by organizations are divided into three categories:

- **Technology-related savings.** The amount of money saved on technology or technology costs avoided by introducing the analytic solution. In keeping with IDC's practice of financial conservatism, only true incremental (i.e., out of pocket) costs were considered.
- **Productivity benefits.** Efficiency savings due to the reduced amount of time and effort required for particular tasks. This category includes productivity enhancements (when a particular group saves time because it can now execute a specific task more efficiently), staff redeployment, and workforce reduction or termination.
- **Business process enhancements.** All identifiable annual savings that were realized due to changes in business process supported by the analytic application. This includes management framework processes (i.e., senior management activities, such as strategy formulation, definition of mission, business planning cycles, etc.), core competencies (i.e., the essential activities for the company), and enabling processes (i.e., necessary activities to support core processes).

Although technology-related savings are often the core focus of a business justification, IDC found these benefits account for only 4% of the total return, while productivity benefits and business process enhancements account for 42% and 54%, respectively. This finding highlights the importance of change management and process improvement to an organization. The various business units affected by the business analytics project must be intimately involved and committed to the project. Likewise, management must have an in-depth understanding of its business processes and a clearly defined goal to be achieved. The conjunction of these two factors is a critical differentiator between pedestrian payback and truly impressive results.

This finding also presents a dilemma for executives responsible for their organization's technology direction. With 96% of total benefits outside their immediate authority, technology executives must ensure that accountability to deliver returns on the analytic investment is assigned to the appropriate area of the organization.



Using Survey Results

There is a tendency to review summary data and assume that every company will obtain similar returns. Unfortunately, the process is not so cut and dry. Average ROI figures, while making interesting headlines, tell only a portion of the story and are not necessarily applicable to individual cases. Every company has a unique cost structure, tax situation, method of measuring ROI, or budget allocation process. Our ROI methodology insulates the results from these factors. Individual companies would best consider using the results with reference to their own set of circumstances. The ROI figures presented in this report should be considered as starting points for setting realistic expectations.

IDC recommends that you review each case study and the individual results for organizations with application needs similar to your own while considering other indicators, such as size and industry. Once you work through this process, you will be in an excellent position to forecast a reasonable rate of return for your particular situation.

The results below are based on 43 participating companies.

Summary of Results

Average ROI = 431%
 ROI range = 17–2,659%
 Median ROI = 112%
 Average payback period = 1.65 years
 Median payback period = 1.03 years

Summary of Financial Assumptions

Discount rate: 15%
 Tax rate: 40%
 Software or hardware expensed up to \$50,000
 Depreciation: Straight line
 Productivity ratings: 65–75%



Sample Selection and Methodology

The companies studied were chosen to represent a fair selection of business analytics customer sites. IDC made efforts to select companies based on a balanced sample of geographic location, industry, and company size. IDC also made efforts to represent various types of applications within the sample. In addition, the companies surveyed were required to meet the following criteria:

- Be in production for at least six months with an analytic application.
- Have pre- and post-implementation information to aid a cost/benefit analysis.
- Be willing to participate in the study and reveal confidential cost and benefit information to IDC.

Senior IDC consultants conducted interviews with a combination of IS managers, business managers, department managers, and system users.

Participating Organizations

Table 1 is a sample list of organizations that participated in *The Financial Impact of Business Analytics* study. Not all organizations are listed. Some organizations preferred to remain anonymous.

Table 1: Sample of Participating Case Study Companies

AdLibris AB	High-Tech Manufacturer
Aramark Uniform Services Inc.	Insurance Company on East Coast
Bank in the United Kingdom	Intel
Bedford, Freeman & Worth Publishing Group	International Truck and Engine Corporation
Brocade Communication Systems	L-3 Communications Corp.
Brother International Corp.	MailWell Inc.
CERN	Major European Airline
Clothing Retailer	Manufacturer of Electronic Devices and Components
COBE Cardiovascular Inc.	Midwest Card Services
Consors Discount Broker AG	Motorola Life Sciences
Credit Union of Texas	Net2Phone Inc.
FedEx Custom Critical	Novo Nordisk
Financial Services Company	Oil and Petroleum Company
Financials and Insurance Services Company	Quaker Chemical Corp.
Gaming, Hospitality, and Entertainment Company	Scotiabank
Gaming Software Company	State of Utah Department of Administrative Services, Department of Finance
Henkel Consumer Adhesives Inc.	Toyota Motor Sales USA
Hewlett-Packard (formerly Compaq)	Union Bank of Norway
HFC Bank	United States Postal Service
Highmark Blue Cross Blue Shield	Zones Inc.

Source: IDC, 2002

2

Five Principles of High-Impact Analytics

This section examines the principles of business impact for analytics (see sidebar *What Is Business Analytics?*). Taken together, the lessons learned from the case studies show that managing the following five principles is important to maximizing ROI:

- Recognize the application imperative
- Democratize information assets
- Build discipline in decision-making processes
- Recognize new skills required for knowledge workers
- Deal with complexity: closed-loop, adaptive systems

Recognize the Application Imperative

Consistently, business analytics project sites advise against tackling everything at once. Address an issue that is business critical where there is a potential for significant payback. In the words of a Hewlett-Packard manager, "Create a small-scale project and move it along. Such a project doesn't require much to get started."

But the "start small" concept has a caveat attached. Organizations with foresight execute the initial business analytics project with an eye to the future. They build in processes for data quality, providing a robust data infrastructure upon which future applications can be added.

The incremental approach is critical when each investment must show a rapid return. But future needs are not addressed unless the first project is a success and demonstrates specific financial benefit. In the words of the vice president of the Database Marketing Group at an insurance firm, "There will be many soft benefits that are highly important, but an early demonstration of real dollar savings is critical to drive the momentum of the application."

Democratize Information Assets

A fundamental shift in the way business decisions are made requires the timely delivery of relevant, targeted information to decision makers in each area of responsibility. In today's business environment, decisions are made more frequently and at all levels of the organization. Decision making is no longer a semiregular senior management activity.

This organizational shift is coincident with a technology shift toward the Web. The pervasive use of the Web for information access is the basis for the democratization of corporate information assets. Many more employees are information consumers and use Web browsers and search engines to locate information. The design of analytic applications can capitalize on these skills, democratizing information access.



What Is Business Analytics?

Business analytics represents the next step in using technology to support an organization's decision-making processes. These solutions analyze business data to discern trends, providing feedback on business performance and leading to decisions on corrective actions that result in measurable gains in cost efficiency or revenue growth.

For example, a transactional procurement application supports a purchasing agent through the process of identifying a supplier, placing an order, and executing the financial transaction. An analytic application that focused on procurement provides feedback on the procurement process. At one site, an analytic application tracks spending on a myriad of items to a detailed degree. Supported by an organizational change to consolidate purchasing responsibilities, the company can approach suppliers as one uniform entity in order to negotiate more favorable contracts.

Other cases of analytic applications examined in the current study that improve decision making across diverse business functions and diverse industries include:

- Portfolio management
 - Finance managers at a high-tech manufacturer are using an analytic application to manage the mix of revenue-generating projects and avant-garde research in its R&D portfolio, ensuring the right ratio of bleeding-edge to bread-and-butter projects.
 - Finance management and editors in an academic publishing company are using an analytic application to determine the optimal portfolio of books and related materials to achieve corporate cost containment and profitability goals.



- Marketing campaign analysis

- Marketing professionals in several industries are using predictive modeling analysis of customer buying trends in order to reduce the cost and increase the return from marketing campaigns executed via direct mail.

- Manufacturing quality

- Managers in a semiconductor manufacturing company are using an analytic application to more rapidly analyze the quality of samples in batch production processes, enabling timely adjustments for higher yields and improved quality.

The business analytics cases provide some essential guidance to approaching analytic application design:

- **Simple application interfaces.** A manager at Motorola Life Sciences, a Fortune 1000 manufacturing company, states: "A simple interface is critical. If no training is required, benefits can be achieved immediately without the delay of a learning curve."
- **User involvement in system design.** Successful companies involve users early in the design and ongoing revision of the system, starting with a prototype or pilot and obtaining feedback. Often the growth of an analytic application is an organic process.
- **Controlled empowerment.** Users should feel empowered, but the access to information given to users must be limited according to their roles and responsibilities.

An increased base of decision makers and the frequency of decision making raise the potential for return on a technology investment focused on improving the process. The economics are straightforward — the more users gain benefit from an analytic investment, the greater the potential ROI.

Build Discipline in Decision-Making Processes

Another key to maximizing ROI is how an analytic application is used and whether or not it drives improvement in decision making. Advice from Cline at FedEx Custom Critical is to "start with the process and the desired best practices before even looking at technology." The goal is to improve by driving consistency in decision making. Organizations must capture the best-known practices of experienced performers who use information to identify root causes of problems or select wisely between alternative courses of action. The preservation of expertise is a basic premise of knowledge management and was in evidence at a number of sites. This is particularly important for operational decisions that are made repeatedly by different individuals in an organization. For example:

- At publishers Bedford, Freeman & Worth, the arrangement of information and the sequence of screens in the application remind users of all of the financial considerations needed to make a project investment decision.
- Scotiabank finds that a factual, scientific approach to decision making, based on sound analytic data, is very powerful. Objective data makes it much easier to communicate across business lines and avoid friction associated with subjective views.

Consistency in the decision-making process is the goal. It also brings a heightened sense of accountability for the quality of decisions and the accuracy of forecasts.

Recognize New Skills Required for Knowledge Workers

Business analytics changes the way people have to think. They must think analytically, and that's not always something that can be taught.

- Marketing professionals must be able to apply segmentation and cross-selling models to determine the next wave of a marketing campaign.
- Editors need to apply financial metrics to evaluate whether or not to recommend publishing a new edition of a college textbook with all its supporting materials.

Train users well. At Hewlett-Packard, the senior manager of information and analysis, quality, and customer satisfaction for the Commercial and Consumer Mobile Products division observed, "This is not a tool for the average user. They made [the analytic software] very user friendly, but it's like giving a weapon to someone who doesn't know how to use it. They would hurt themselves."

Business analytics impacts people — from the business process to the job requirements, and, ultimately, to the hiring process. In short, business analytics is redefining the knowledge worker. As the knowledge bar is raised, we expand the knowledge worker's reach. But we also expand the level of skills required for a knowledge worker to get a job done.

Deal with Complexity: Closed-Loop, Adaptive Systems

What goes around, comes around. From a technology perspective, the success of a closed-loop system hangs on the slender thread of data quality. From an organizational perspective, success depends on the willingness of employees to accept the adjustments to operational rules that stem from the analysis.

The purpose of business analytics is to analyze the feedback from operations on what is purchased, shipped, or managed. Based on the analysis, adjustments are made to operations, and the cycle continues. We learn and then we correct. Hence, the combination of analytics and operations creates an adaptive system that helps organizations deal with complexity.

The broader environment for the analytic application is more likely to be a collection of applications and systems rather than a single system. Each business process (such as procurement or customer service) can be supported by a system that has grown organically — specialized operational systems interoperating with purpose-built analytic applications. Getting through the complexity crisis requires that these systems work with one another to deliver maximum results. A majority of sites recognized the value of a data warehouse and its accompanying processes to enable the analytics to work on a base of quality data. A closed-loop system intensifies this requirement.





This cycle of correction and improvement was pervasive in the business analytics cases:

- At Brocade Communication Systems, a forecaster of product demand analyzed the accuracy of past forecasts in a successful effort to improve his next forecast. A more accurate forecast meant that there needed to be fewer last-minute changes or escalations to the manufacturing schedule.
- For Brother International, an analysis of frequently asked support questions, updated daily, enables customer support representatives to respond more quickly and accurately to customer questions, reducing customer service costs.

Business Objects

3

Key Qualitative Benefits

Every savvy technology buyer or management decision maker must balance a quantitative assessment with a qualitative assessment when evaluating investments of any kind. IDC finds that the five most important qualitative benefits of business analytics projects, culled from the 43 organizations interviewed for this study, are:

- Better decision making
- Alignment with stated business objectives
- Improved business performance
- Improved visibility
- Continuous improvement

Better Decision Making

Without fail, businesses cited better decisions and an increase in confidence in those decisions as a primary benefit of analytics.

Backing up business-savvy intuition with hard facts and in-depth analysis is an invaluable change for the better, primarily because it circumvents much second-guessing, discussion, and delay. Decisions are made quickly, and those involved are convinced that the final decision is the right one. But every company in the study touts the value they gain from not just viewing the data but also viewing the data in many different contexts and with varied input.

Alignment with Stated Business Objectives

Business analytics facilitates the achievement of specific goals by bringing into line all the factors (people, operations, decisions, tasks) that can affect reaching the goal, moving all factors in the right direction at the same time.

A company's ability to affect internal action and perception based on corporate objectives is vastly underrated. Bringing about a transformation and ensuring the entire company is working in unison toward a common goal means the goal is reached more quickly and with less internal conflict. Furthermore, implementing an analytic application of any type forces an organization to express its objectives and outline a plan of action to achieve them.





Improved Business Performance

The introduction of business analytics has a positive influence on performance.

Many companies employed business analytics to increase profit margins, decrease expenses, or achieve better inventory management. Along with these deliberate changes came a corresponding increase in performance. However, because there are so many variables in play that can and do influence performance, it was impossible for the company to isolate and measure the contribution of the analytic application.

Improved Visibility

Organizations were blind to some aspect of their business, before implementing an analytic application.

With an analytic application in place, the organization can pay more attention to its business and explore possibilities further within the context of the application. New opportunities and ideas are born from this encouragement. Also, with the increase in visibility comes an increase in knowledge of the links between various elements of the business and profitability. Visibility takes much of the guesswork out of decisions, upping the odds of a positive outcome.

Continuous Improvement

The analytic application is a conduit for change to business processes, actions, and end-user skills.

Organizations manage change, in many cases profound change, before, during, and after analytic application deployment. To their surprise, organizations found that change doesn't stop when the analytic application is deployed. Business units ask for additional capabilities, processes are revamped, management hires employees with different skills, and the change continues. The pace of change has to be managed to the organization's comfort, but the continuing cycle is beneficial to the business.

4 Implementation Issues

Implementation decisions can dramatically affect the potential impact of an analytic application investment. These decisions include:

- Business process targeted
- Implementation approach

By learning about the financial implications of their implementation decisions, organizations are better equipped to effectively manage the application implementation and optimize results.

The Business Process

Each business analytics project tends to concentrate on a single business process or group of related business processes. But IDC found that there is no single starting point for a company. In fact, organizations move from one business process to another in successive projects. The key is to maintain a focus for the duration of the project, demonstrate value, and build support for extending analytics to new functions and processes.

IDC grouped the business analytics projects into three distinct categories, based on the nature of the information and functions impacted:

- **Customer relationship management.** CRM analytics projects seek to enhance customer support and marketing initiatives, decreasing costs and increasing opportunity.
- **Financial/business performance management.** Financial/business performance management projects seek to increase efficiency in financial processes, such as budgeting.
- **Operations/production.** Operations/production business analytics projects seek to optimize the production and delivery of a business' products and services.

The Bottom Line

IDC's research uncovered the following:

- A large investment in a business analytics project does not necessarily lead to higher returns.
- Consistently favorable results demonstrate that a business analytics project can be considered a worthwhile investment across all three business process categories.
- Analytic applications that have a relatively higher impact on productivity enhancements result in faster payback for the organizations despite higher average costs.





As shown in Table 2, organizations implementing analytics for CRM make the greatest average initial investment, while those implementing analytics for financial/business performance management spend far less. However, the two organizations with the largest total investment in an analytic application in the operations/production category received the lowest ROI of that category. Conversely, the two organizations with the lowest total investment, less than \$200,000, achieved the highest returns of that category with an ROI much greater than 1,000%.

Table 2: Average Investment by Business Process (\$)

	Initial	5-Year Total
Customer relationship (CRM)	1,846,172	7,742,775
Financial/business performance	280,076	1,249,775
Operations/production	1,507,724	4,257,838

Source: IDC, 2002

As shown in Table 3, the ROI ranges for the three types of business processes are quite broad. Operations/production shows the highest median ROI. IDC elected to not publish the average ROI findings by business process type since the wide distribution of results combined with the low number of observations for each business process type produces a very high margin of error, creating a high probability the difference between the average ROI for each type would be due to chance. IDC instead chose to publish the ROI range and the median ROI, where half of the cases in the range were higher and half were lower.

Table 3: ROI by Business Process (%)

	Range	Median
Customer relationship (CRM)	17–1,377	55
Financial/business performance	39–2,057	139
Operations/production	17–2,659	277

Source: IDC, 2002

Financial/business performance investments have the fastest average payback period (see Table 4). While 49% of all the analytic application case studies experienced payback in one year or less, fully 58% of financial/business performance management and 55% of operations/production analytic application implementations experienced payback during the same time period. These applications have a relatively higher impact on productivity enhancements, hence the faster payback, despite the higher average costs of operations/production.

Table 4: Payback Period by Business Process (Years)

	Average	Median
Customer relationship (CRM)	2.39	2.59
Financial/business performance	1.13	.81
Operations/production	1.41	.63

Source: IDC, 2002

The Approach

IDC segments business analytics projects into two categories — Buy and Build.

- **Buy.** The implementation of a packaged analytic application, with the supporting data infrastructure, usually customized to meet a company's needs and requirements
- **Build.** The development of a custom analytic application, with the supporting data infrastructure, by an internal team or external services team, using business intelligence tools, templates, and technologies

The more complex, diverse, and less standardized the business process, the more likely it is that a packaged application will not fit the bill. A company is well advised to first tackle a problem with a high impact on business performance. The choice of implementation approach, whether to Build or Buy an analytic application, depends on the problem addressed, the level of skill within the organization, and the availability of packaged solutions. Therefore, a significant return can be achieved by either implementation approach; as long as solving the organizational problem is of paramount importance.

Any project involving a combination of Buy and Build strategies is classified in the Build category in this study. For example, an organization that takes a packaged analytic application, builds a custom application, and then integrates the two applications into one is using this combination approach.

The Bottom Line

IDC research uncovered the following:

- Building an analytic application may generally cost more, but there is no indication that the approach itself materially affects potential return. Organizations that chose to build an analytic application were generally not able to achieve their objective using a packaged application alone.
- Operations/production analytic applications in the Buy category show the highest median ROI of all categories.





Analytics projects in the Build category show a higher total investment than those categorized as Buy (see Table 5). In addition, the distribution of the costs were different with Build analytic applications, showing a greater percentage of costs for internal services. This percentage reflects a greater reliance on in-house IT resources for custom development. On the other hand, Buy analytics projects had a higher percentage of costs for external services.

Table 5: Average Investment by Implementation Approach (\$M)

	Initial	5-Year Total
Build	1.17	5.2
Buy	1.83	3.5

Source: IDC, 2002

Table 6 shows that the median ROI for the Buy category is higher than that of Build, but it takes only a few months longer to achieve payback. It makes sense that Buy analytics projects demonstrate a higher ROI and lower initial investment than those in the Build category. It's the basic premise of packaged applications that organizations can get them up and running more quickly and cost effectively. Clearly, both approaches can deliver value.

Table 6: Return on Investment by Implementation Approach

	Median ROI (%)	Median Payback Period (Years)	ROI Range (%)
Build	104	1.18	17–2,057
Buy	140	.74	17–2,659

Source: IDC, 2002

The majority of analytic applications in the Build category were focused on operations/production (43%). The dominant approach of Build for operations/production processes is not surprising. This category is the most differentiated by industry because a company's products or services establish the industry the company is in. As a result of this diversity, packaged applications are not always available to address specific operations/production issues. In the Buy category, CRM and operations/production each represented 40% of the analytics projects. The number of CRM analytics projects in the Buy category reflects the growth of packaged analytic applications, particularly for marketing campaign management and analysis. Table 7 shows median ROI for each implementation approach by all three business process categories.



Table 7: Median ROI by Target Business Process and Implementation Approach (%)

	Buy	Build
Customer relationship (CRM)	55	100
Financial/business performance	217	102
Operations/production	307	262

Source: IDC, 2002



Brother International Corporation

Bridgewater, NJ

ROI 32%

Background

Office equipment has come a long way since the typewriter and carbon paper. Now, small offices, home offices, and mobile offices can use a single machine, which costs only a few hundred dollars, to print, fax, copy, and scan. Brother International Corp. manufactures these multifunction devices and other consumer electronics.

Several big-name players compete in the consumer electronics market, and their products are found on the shelves of office superstores. Prices are similar, but features and functions vary. Brother's strategy is to provide products that are rich in function and have added value that place them at a higher price point.

The Challenge

In the mid-1990s, the major distribution channel for office products shifted to the "superstore," product showcases with a range of mainstream brands but less individualized sales service. Once the sale is made any future questions or issues are the responsibility of the original supplier. Most stores also have liberal return policies and take back products with no questions asked because excess or unsold equipment goes right back to the manufacturer.

Returns were becoming a huge headache for Brother, and the reduction in customer hand-holding, a result of the move away from small value-added retailers, seemed to be a major factor. Senior management recognized that the company had to get into the end-consumer support business or continue to suffer a costly return rate. Brother needed to better understand its customers' choices and actions. To achieve that goal, Brother required a level of analysis that its current customer data sources could not sustain.

The Result

All customer information is now in one database, accessible by any customer service representative (CSR) in any of four call centers.

The new application automatically analyzes inquiries daily and creates a fresh top 10 frequently asked questions (FAQ) list, which is displayed on each CSR's desktop. This list and improved search capabilities have reduced the average call length.

Prior to the new application, CSRs required an average of 45 minutes to field each of the 600 calls per month regarding device drivers. Now these calls are handled in about six minutes. In general, the use of the new database reduces talk time by 10% on about 60% of the calls, which translates to just over \$0.50 in savings per call. This result is even more significant when multiplied against a million or more calls per year.

Brother has met its business goals of better customer service at a lower cost and returns are down 50% since the inception of the call centers.

Manufacturer of Electronic Devices and Components

Palo Alto, CA

ROI 139%

Background

In the high-tech industry, new and improved electronic devices and components seem to appear almost daily, so competitive advantage is about gaining mindshare through strong brand recognition and a long-term market presence. The central research arm of this manufacturer of electronic devices and components focuses on technical innovations that either create new businesses or enhance existing products — activities critical to the competitive advantage, growth, and profitability of the company.

The Challenge

R&D activities come with significant risk. Major breakthroughs can take years, and some work may never produce a tangible return. Therefore, the manufacturer must manage the mix of revenue-generating projects and avant-garde research in its R&D portfolio to ensure the right ratio of bleeding-edge to bread-and-butter technology.

The company also needs to maintain a balance between short-term projects, which take one to three years, versus longer-term activities, which could take up to 10 years. Research projects are classified as either supported or unsupported. Supported work is sponsored by a particular business unit, while unsupported is more broad R&D that might be useful to one or more lines of business. Knowing the ratio of supported to unsupported projects is important to the research laboratory's relationship with the rest of the organization. Its internal customers want to make sure their R&D dollars are well spent — and demonstrate value that can be shown on a quarterly report.

The Result

The electronic devices and components manufacturer now has a customizable portfolio analysis and reporting system that places all of the required portfolio management information at the fingertips of business managers and lab directors, and it provides the means to support the corporate objectives of speed, focus, and accountability. Managers now spend much less time gathering numbers and more time making decisions and taking action.

It used to take two people two weeks to produce the previous version of the quarterly portfolio analysis report. Now, it's less than an hour's work to load the data and output is available instantly. When the chief technology officer calls the finance department to help answer questions for the CEO, they get the data in less than five minutes. Previously, that task would take at least a week.

Laboratory directors can more clearly demonstrate and communicate their value to the business units. If a unit is facing a new competitive pressure and wants to know what to tell customers about new solutions in the pipeline, the lab can respond accurately and quickly to fuel important business decisions.

The R&D budgeting process is now much less painful and much more civilized. The analytic data clearly shows all the projects and their attributes, so the manufacturer can decide how money should be spent by looking at the forest instead of the trees. The actions of lab directors at a recent budget meeting, where some lab directors voluntarily cut their own budgets because it was clear that the money would be better applied to other research, clearly demonstrated cross-laboratory collaboration and synergy.





Novo Nordisk

Copenhagen, Denmark
ROI 889%

Background

Novo Nordisk is a healthcare company with a major practice in diabetes care, as well as specializations in areas such as coagulation disorders, growth disorders, and hormone replacement therapy. Novo Nordisk manufactures and markets the broadest diabetes product portfolio in the pharmaceuticals industry.

The Challenge

The diabetes care market is expanding rapidly, but it is a supply-constrained market. The time and cost associated with building new production plants combined with the very strict regulatory compliance standards set by various governmental organizations prevent Novo Nordisk from expanding its production facilities. Thus, Novo Nordisk has to optimize each step of its value chain. This requires a comprehensive performance measurement system that helps the company better monitor its production process and determine when and where to take corrective actions.

The Result

Novo Nordisk's management put in place a process to identify and define relevant key performance indicators (KPIs) that are now used to measure the company's performance. Strategy is translated into specific objectives that are communicated throughout the organization in the form of specific goals and tasks. Successful completion of specific goals and tasks are tracked by the KPIs.

The healthcare supplier consolidated all of its KPI metrics, which fall into one of the following four areas: workforce statistics, business processes, financial information, and customer perspective ratings. The data provided by the analytic application facilitates sound discussions between managers of target deviations, implementations of better practices, and initiation of corrective actions.

Broad companywide access to relevant and consistent performance indicators has dramatically improved the efficiency of Novo Nordisk's manufacturing sites. The new analytic application has generated substantial benefits by enabling Novo Nordisk to identify trends in its overall performance and take the necessary corrective actions. The company has also initiated actions to reduce the amount of scrap that is produced during the filling process from 4% to zero, generating significant cost savings.

In summary the analytic application enables Novo Nordisk to make more informed decisions based on hard facts; to analyze cause and effect relationships between KPIs, actions, and initiatives; to identify potential problems and take corrective action; to identify and benchmark best practices; and to make this invaluable information available to the entire organization.

United States Postal Service

Washington, D.C.

ROI 1,377%*

Background

The United States Postal Service (USPS) delivers to more than 140 million addresses each day, six days a week, and serves seven million customers a day at 38,000 retail outlets from Maine to Guam. The USPS faces four challenges prevalent in the delivery industry today: decreased paper mail volumes, more alternatives for delivery, fixed costs dictating an unremitting profit threshold, and the need to implement better security for increased safety.

The Challenge

The Postal Service is primarily self-funding. Retail revenue accounts for 25% of total postal revenue. The postal-run retail outlet business is the subject of this case summary.

The critical challenge was to improve profitability of the retail outlets through revenue growth and operational efficiency. The vehicle for accomplishing this was the application of transactional data to improve decision support, better control inventory costs, increase cross-selling opportunities, track employee activity, and reduce fraud. However, data availability and quality had to be improved. In general the data was unavailable for most uses and available only with difficulty on a limited, high-level, decision-making basis.

The Result

USPS installed a Retail Data Mart (RDM) to capture transaction data from a networked point of sale source system. The RDM provides a single version of the truth for the retail operation and a foundation for the corporate data warehouse. The long-term plan is to capture detailed data from other areas of USPS and integrate this data in a central repository.

With this approach, USPS can enable timely and insightful management reporting as it easily shares this integrated data. This includes data derived from specialized applications, such as a demand chain tool. It also is possible to drill down below the regional level to the unit level and, in the case of POS sites, the actual system level. To date, this has allowed management to identify both trends and drivers of retail sales and to take appropriate action based on the findings.

Data from all transaction types is captured in the RDM for subsequent analysis. For example, the RDM permits the analysis of special services (i.e., value-add sales). It is now possible to differentiate performance among the sales associates (as measured by number of cents on the mailing dollar). This has opened the opportunity for targeted training and pop-up cross-sell recommendation screens to increase special services revenue.

In addition, the USPS can now determine the degree of usage of each POS terminal and identify unused terminals. For example, during the 2000 holiday season, which is the period of highest terminal usage, the reports indicated that 1,500 POS systems (having an aggregate cost of about \$9 million) had not been turned on. These systems are available for redeployment.

Accurately assessing workloads with true averages and daily refreshes has improved planning and human resource allocation. In addition, the Postal Inspection Service has used the system a great deal to analyze data to identify and prevent fraud.



* The USPS does not pay Federal and State taxes. For the purposes of comparison, a standard calculation was applied to all cases. Therefore, the actual ROI for the USPS would have been higher than shown.

Conclusion



Conclusion

Our study examines the experience and organizational impact of 43 analytic application implementations undertaken by organizations that were interviewed by IDC over the course of four months. The study found that an analytic implementation generates a median five-year ROI of 112% with a median payback of 1.03 years on median total costs of \$2.08 million. Of the organizations included in this study, 54% have an ROI of 101% or more.

The motivation for investment in business analytics was varied. For some it was to consolidate and gain global visibility across organizational data; for others, it was to streamline operations or production processes; and, for still others, it was a wholesale reinvention of their approach to their business or customers. Clearly, the deployment of an analytic application can be used as a focal point and a facilitator for business process improvement and reinvention — be it a radical organizational change or increased efficiency and productivity.

These case studies are proof that a business analytics implementation can be a substantial investment for an organization, delivering substantial benefits. Organizations cannot afford to overlook the value that an analytic application can provide — increasing business performance and employee productivity as well as reducing operations costs and improving customer relations. Organizations interviewed for this study considered their particular business analytics implementation either a necessary cost of business or a critical factor in their plan for success and survival in a highly competitive market.

Furthermore, this study confirms that analytic applications overall do promote more effective action, facilitate process improvement and increase productivity. Implementation approach and the targeted business process are key success factors for organizations deploying these applications. These factors, combined with an organization's ability to match outgoing costs to the time and amount of benefit received, seem to have the greatest impact on ROI potential.

Regardless of the type of analytic application being deployed, from manufacturing quality analysis to financial planning or marketing campaign management, a majority of organizations attained a rapid or reasonable payback. If only for this reason alone, organizations should give close consideration to employing business analytics.

Analyst Biographies

Henry Morris, Ph.D.

Vice President, Applications and Information Access

Dr. Morris has conducted extensive research on the increasing importance to organizations of analytic applications and closed-loop systems that help them increase the efficiency of core processes or to discover new business opportunities.

Stephen Graham

Vice President, Global Software Partnering and Alliances

Mr. Graham is responsible for IDC's analysis of the partner networks developed by software vendors and services firms. In addition, Graham is responsible for comanaging IDC's worldwide research on the appsourcing market.

Robert Blumstein

Director of Research for CRM Analytics and Marketing Applications

Mr. Blumstein has 18 years of experience in the direct marketing and analytics field. He researches analytic applications that can be coupled with business operations and CRM-specific analytic applications.

Dan Vesset

Research Manager, Data Warehousing and Information Access

Mr. Vesset's research is currently focused on the business intelligence and analytic applications markets. These encompass multidimensional analysis, end-user query and reporting, data mining, and other related business intelligence tools, as well as supply chain and Web site analytic applications.

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Ms. Moser is a senior research analyst in IDC's ASP and Application Management program. She examines different strategies and practices employed by appsourcing suppliers in pursuit of emerging opportunities.

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Ms. Carr is a senior management consultant with 12 years of experience consulting to a wide range of industries, including financial services, utilities, telecommunications, retail, the public sector, and ebusiness.





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