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THE RISE OF ANALYTIC APPLICATIONS: BUILD OR BUY?

by Wayne W. Eckerson

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About the Author

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Eckerson has written and spoken extensively on data warehousing and business intelligence since 1994. He has published in-depth reports and articles about data quality, data warehousing, customer relationship management, online analytical processing (OLAP), Web-based analytical tools, and portals, among other topics. In addition, Eckerson has delivered presentations at industry conferences, users group meetings, and vendor seminars. He has also consulted with many large vendor and user firms.

Prior to joining TDWI, Eckerson was a senior consultant at the Patricia Seybold Group, and Director of the Group's *Business Intelligence & Data Warehouse Service*, which he launched in 1996. Eckerson has a B.A. from Williams College and an M.A. from Wesleyan University. Eckerson lives and works in the coastal town of Hingham, MA, with his wife and two children.

About the TDWI Report Series

This series is designed to educate technical and business professionals about new business intelligence technologies, concepts, or approaches that address a significant problem or issue. Research for the reports is conducted via interviews with industry experts and leading-edge user companies, and is supplemented by a survey of business intelligence professionals.

To support the program, TDWI seeks vendors that collectively wish to evangelize a new approach to solving business intelligence problems or an emerging technology discipline. By banding together, sponsors can validate a new market niche and educate organizations about alternative solutions to critical business intelligence issues. *Please contact Wayne Eckerson at weckerson@dw-institute.com if you would like to suggest a topic that meets these requirements.*

About TDWI

The Data Warehousing Institute (TDWI), a division of 101communications LLC, is the premier provider of in-depth, high-quality education and training in the business intelligence and data warehousing industry. TDWI is dedicated to educating business and information technology professionals about the strategies, techniques, and tools required to successfully design, build, and maintain data warehouses. It also fosters the advancement of data warehousing research and contributes to knowledge transfer and the professional development of its Members. TDWI sponsors and promotes a worldwide Membership program, annual educational conferences, regional educational seminars, onsite courses, solution provider partnerships, awards programs for best practices and leadership, resourceful publications, an in-depth research program, and a comprehensive Web site.

Executive Summary

The rise of analytic applications has gained considerable attention in the trade press and analyst circles. Yet, for all the talk, there is little consensus about what analytic applications are, what additional value they provide, and how best to deliver them.

What They Are. The Data Warehousing Institute (TDWI) defines an analytic application as a domain-specific solution that enables all types of business users to access, analyze, and act on information in the context of the business processes and tasks they manage. The solution leverages data warehouses and analytic tools and integrates with operational systems. Moreover, TDWI contends that organizations can either **build** or **buy** an analytic application.

Build Versus Buy. Currently, almost two-thirds of organizations are building rather than buying analytic applications, but this will soon change. The percentage of organizations that would be "interested" or "very interested" in purchasing packaged analytic applications will increase from 47 percent today to 62 percent by 2004, a one-third gain. Moreover, two-thirds of organizations that are building analytic solutions first looked to implement a suitable package.

By 2004, there will be many more analytic packages available in a broad cross-section of functional areas (e.g., sales, marketing, and supply chain) as well as industry-specific niches. These packages will grow in functionality and flexibility, making them an attractive option for organizations that want to rapidly deploy complete analytic solutions.

Meanwhile, vendors are introducing rapid application development tools for building custom analytic applications. TDWI calls these tools analytic development platforms (ADPs). These component-based, graphical development tools minimize coding and make it easier and less expensive for an IT group to build highly functional custom solutions.

Ultimately, analytic packages and ADPs will converge, giving users the best of both worlds. The "build versus buy" debate will eventually mutate into a "buy AND build" fiesta.

Selecting the Right Path. Until then, organizations need to identify the pros and cons of building versus buying. Typically, companies build analytic applications to obtain the functionality they want within an existing data warehousing environment. On the other hand, companies often buy analytic packages to accelerate the delivery of best practice functionality in the absence of a data warehouse or to complement a packaged operational application.

In the final analysis, both approaches deliver equivalent outcomes. Both enjoy the same rate of success in meeting user needs and finishing projects on time and within budget. So, it's not whether you build or buy that determines success, it's how well your team executes its project plan.

For more information about this report or its sponsors, and to view the archived report webinar, please visit: www.dw-institute.com/aareport/.

Introduction: Scope, Methodology, and Demographics

A Definition Is Not Enough

Questions Abound. There is considerable confusion today about analytic applications. Business intelligence professionals are understandably perplexed by this new term and are asking questions such as:

- "How are analytic applications different from the decision support systems and tools that we've been using for years?"

- "What are the benefits and ROI of buying a packaged analytic application compared to building a custom analytic application?"

- "Are the packages and tools for deploying analytic applications mature enough to invest in them?"

- "How do we differentiate the tools and packages for deploying analytic applications offered by various vendors?"

The Analytic Applications Market Will Grow To $6 Billion By 2005 - IDC

Market Size. Our industry deserves clear answers to these and other questions. According to the International Data Corp., the market for analytic applications will grow from $2.5 billion to $6 billion by 2005. Without a basic understanding of analytic applications, money invested in this new market may be misspent.

Report Scope. This report attempts to answer the above questions about analytic applications. Specifically, it will explore what an analytic application is and what it is not. It will provide criteria for evaluating analytic applications and discuss the pros and cons of purchasing an analytic package versus building a custom solution. Finally, it will offer guidelines for determining whether your organization should build or buy an analytic application.

Methodology. The research for this report was conducted by interviewing industry experts, including consultants, industry analysts, and IT professionals who have implemented analytic applications. The research is also based on a survey of business intelligence professionals that TDWI conducted in July and August of 2002.

Survey Demographics. TDWI received 578 valid responses to the survey. Most were corporate IT professionals who work at large U.S. companies in a range of industries. Eighty-four percent of the respondents had deployed a custom or packaged analytic application, or were planning to do so soon. (See the following illustrations for breakouts.)

Respondents who identified themselves as vendors, professors, or students were not counted in the survey results. Respondents who were not planning to deploy an analytic application, or weren't sure, were filtered from answering most questions. Respondents who "built" analytic applications were shown a different subset of questions from those who "bought" analytic applications. This filtering and branching logic accounts for most of the variation in the number of total respondents to each question. Multi-choice questions and rounding account for percent totals that do not equal 100 percent.

Demographics

Position

65% — Corporate IT professional (65%)
25% — Systems integrator or external consultant (25%)
10% — Business sponsor or business user (10%)

Level

52% — Corporate (52%)
15% — Business Unit (15%)
11% — Division (11%)
11% — Department (11%)
11% — Does not apply (11%)

Company Revenues

15% — Less than $10 million (15%)
17% — $10 million to $100 million (17%)
24% — $100 million to $1 billion (24%)
31% — $1 billion to $10 billion (31%)
13% — $10 billion + (13%)

Countries

78% — USA (78%)
4% — Canada (4%)
2% — United Kingdom (2%)
16% — Other (16%)

Industry

Industry	Percent
Consulting/Professional Services	12%
Financial Services	11%
Manufacturing (non-computers)	10%
Federal Government	9%
Software/Internet	8%
Retail/Wholesale/Distribution	7%
Healthcare	6%
Education	6%
Insurance	4%
Telecommunications	4%
Computer Manufacturing	4%
Food/Beverage	3%
State/Local Government	3%
Other Industries	13%

A New Old Market

The term "analytic application" has emerged as an important new business intelligence trend. Yet, many business intelligence professionals are wondering if this term truly signifies something new, or whether it simply repackages existing analytic technologies and processes under a new banner.

The truth is that the market for analytic applications is both new and old.

What's Old?

For the past 10 years, business intelligence professionals have employed analytic technologies and products—including data warehouses, query and reporting tools, OLAP products, data mining tools and algorithms, and visualization techniques—to deliver information and insight to business users. In most cases, organizations use these tools to create access methods and reports for specific functional areas, such as sales, marketing, finance, and manufacturing.

Many business intelligence professionals may consider the results of these projects to be analytic applications. And they are right—to a degree. These handcrafted solutions "apply" "analytic" technologies to business needs in specific functional areas.

So, what's new about an "analytic application" in the year 2002?

The Old Way: Apply Analytics To Functional Areas

Definitions

Analytic Application—An analytic application enables business users to access, analyze, and act on information in the context of the business processes and tasks they manage. It embeds domain knowledge that supports the unique information requirements of users in a specific department or functional area.
An analytic application is a complete solution that usually leverages a data warehousing environment, embeds analytic tools, and employs business process logic. You can either build or buy an analytic application.

What it's not: An analytic tool (see below)

Packaged Analytic Application – *The "buy" option*—A vendor-supplied package that provides domain-specific analytics. It contains an integrated set of analytic tools, data models, ETL mappings, business metrics, predefined reports, and "best practice" processes that accelerate the deployment of an analytic application in a given domain or across multiple domains.

What it's not: An analytic tool (see below)

Custom Analytic Application – *The "build" option*—An analytic application that is primarily built using tools, code, or customizable templates to provide the exact look, feel, and functionality desired by an organization for its analytic environment.

What it's not: An analytic tool (see below).

Analytic Development Platform (ADP)—A development environment that enables developers or savvy business users to build custom analytic applications using predefined components, services, and/or starter kits in a graphical environment that minimizes coding and facilitates rapid prototyping and deployment.

What it's not: An analytic tool (see below).

Business Analytic Tool (or Analytic Tool)—A tool that provides query, reporting, OLAP, or data mining functionality for end users but offers little or no ability to extend or substantially customize functionality or the end-user environment.

What it's often called: A business intelligence tool or decision support tool.

Business Intelligence—The processes, technologies, and tools needed to turn data into information, information into knowledge, and knowledge into plans that drive profitable business action. Business intelligence encompasses data warehousing, business analytic tools, and content/knowledge management.

What it's not: An analytic tool (see above).

What's New?

Four factors differentiate today's analytic applications from previous generations of analytic tools and applications. TDWI calls these the four "Ps" of analytic applications: (1) perspective, (2) process, (3) packages, and (4) platforms.

1. Perspective. A true analytic application contains some level of domain knowledge about a functional area, such as sales, marketing, or manufacturing, in a particular industry. The best analytic applications embody industry best practices represented as key performance indicators or metrics within a set of predefined reports or report templates.

The Four "P's" Of Analytic Applications

For example, a procurement analytic application might provide a set of reports that help purchasing managers optimize spending on materials for a manufacturing plant. The spending optimization reports will highlight best practice metrics, such as aggregate spending per supplier on a global basis, average order value, and percentage of order volume purchased outside existing contracts.

"The real benefit of an analytic application is the domain knowledge or intellectual capital it contains about a functional area," says Bill Schmarzo, vice president of analytic applications at DecisionWorks Consulting and a TDWI faculty member who instructs on analytic applications at TDWI conferences.

2. Process. Another trademark feature of an analytic application is that it is… well… an application! Just as operational applications step users through a predefined business process, analytic applications do the same for decision-making processes.

An analytic application is not just a bunch of reports or an analytic tool to perform ad hoc queries or create reports. It is a real application that provides transparent support for the analytic processes that individuals and groups use to analyze data, make decisions, and act on plans. These analytic processes can be procedural, contextual, collaborative, event-driven, transactional, or evaluative. (See "Provides Decision Process Support" for more details.)

Analytic Applications Transparently Support Decision Making Processes

In the past, organizations gave users an analytic tool, provided some training, and hoped for the best. The result was usually failure or lots of underutilized software. A recent report by Nigel Pendse and Survey.com discovered that organizations never deploy an astonishing 39 percent of the OLAP licenses they purchase.[1]

Analytic applications promise to reverse this trend by embedding analytics into the fabric of users' daily business processes and tasks. Users don't have to wrestle with a tool to access, analyze, and act on information. They simply use an analytic application that supports their decision-making style, business processes, and collaborative activities in a seamless, intuitive fashion.

3. Packages. In the past, organizations had to stitch together multiple products and components using hand-written code to create an analytic application. Today, many vendors offer *packaged analytic applications* that pre-integrate analytic and data warehousing components, including data models, ETL tools, meta data, analytic tools, reports, and portals.

These packaged applications typically provide 65 to 85 percent of a complete solution, greatly accelerating and simplifying the deployment process. Most analytic packages are tailored to specific functional areas, such as sales or marketing, or applications in vertical industries,

[1] Nigel Pendse, "The OLAP Survey," Published by Survey.com, July 2001. See www.survey.com.

such as retail merchandising and assortment analysis. These packages embed domain knowledge of specific functional or vertical applications in data models and reports.

Analytic Applications Are NOT Just Packages

4. Platforms. But, contrary to public opinion, analytic applications are not just packaged solutions. Today, organizations can just as easily build an analytic application as buy one. That's because an emerging class of vendors offers specialized tools for rapidly building *custom analytic applications* on top of an existing data warehouse or data mart.

These tools—which TDWI calls *analytic development platforms*—enable developers or savvy business users to build custom analytic applications using predefined components, services, and starter kits in a graphical environment that minimizes coding and facilitates rapid prototyping and deployment.[2]

Traditional Analytic Tools are Hard-Wired Monoliths

In contrast, most analytic tools (a.k.a. decision support tools or business intelligence tools) are hard-wired monoliths with a vendor-supplied look and feel—what you see is what you get. Administrators cannot easily modify the vendor's GUI, add new functions, modify or extend existing functions, or dynamically personalize the end-user environment (e.g., GUI, functionality, or views) to fit the user or group.

Complete Solution. In summary, an analytic application is a domain-specific analytic solution that integrates a diverse set of data warehousing and analytic tools that organizations previously had to painstakingly stitch together.

New packages and development tools enable organizations to rapidly deploy analytic solutions that address the unique information needs of knowledge workers in specific departments or lines of business. As applications, these new products provide built-in support for decision-making processes that knowledge workers use to access, analyze, collaborate, and act on information.

The Time Is Right

Although analytic applications are still in their infancy, they represent the next phase in the evolution of business analytic tools. Advances in technology, a heightening demand for holistic solutions, and enterprise-scale deployments are fueling the inexorable migration to analytic applications.

BI Mirrors The Evolution Of Operational Applications

Technology Advances

During the past two decades, business analytic tools have evolved from mainframe reporting languages to desktop query, reporting, and OLAP tools to Web-based analytic suites. Along the way, organizations have deployed data warehouses to offload query processing from operational systems and provide a consistent set of data for end users to create reports and analyze data in an increasingly sophisticated fashion. (See illustration 1.)

Vendors Deliver Greater Integration. Analytic applications are the next logical step in this technological progression. To increase the value of their products, vendors have continually sought to integrate a larger number of the elements required to deliver a complete business intelligence solution. These include infrastructure elements (e.g., data models, ETL, source adapters, data warehouses) and analytic elements (e.g., user interfaces, analytic engines, visualization tools, security services, broadcast servers, and portals).

[2] There are also data warehouse development platforms, sometimes called "packaged data warehouses," which automate the design, deployment, and maintenance of a data warehouse.
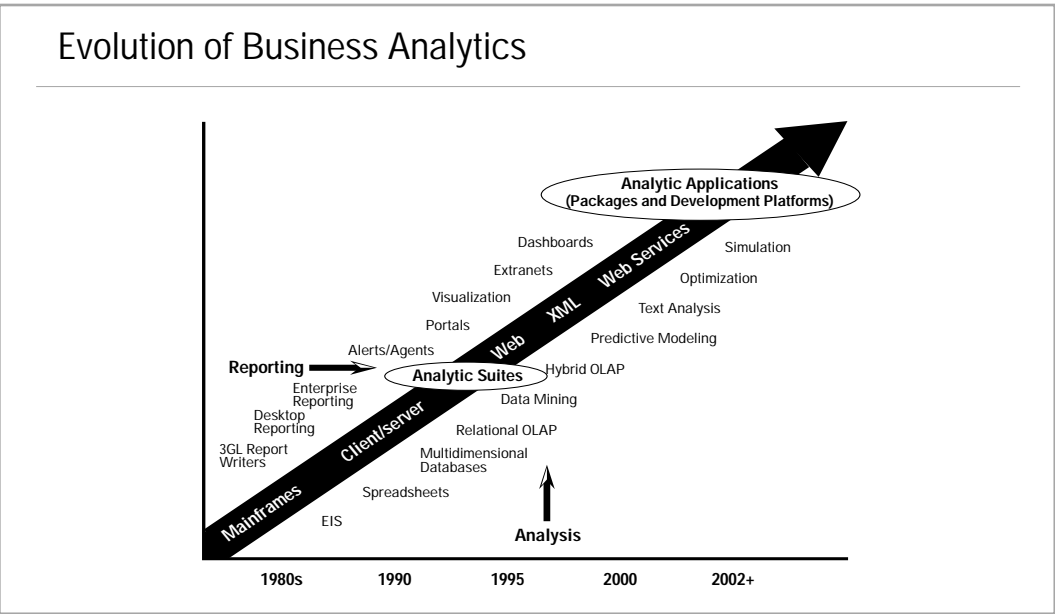
Illustration 1. Business analytic tools have evolved considerably since the 1970s and early 1980s when 3GL reporting languages, mainframe-based EIS systems, and spreadsheets dominated the landscape. Client/server reporting and analysis tools converged in the 1990s to create analytic suites, which then migrated to the Web. Reporting and analysis tools will continue to evolve in specialized areas, such as performance dashboards and optimization algorithms, but the biggest areas of growth in the next several years will be in custom and packaged analytic applications.

In many respects, the evolution of business analytics mirrors the way operational applications evolved from programming languages and toolsets to packages and development platforms. (See illustration 2.)

Firms Deploy Operational And Analytic Packages At The Same Time

One difference is that the analytic applications market is evolving more quickly. This is because the SAPs of the world have already convinced many companies of the value of buying a packaged application, paving the way for packaged analytic vendors. In fact, once companies decide to implement a packaged operational application, they are more likely to implement a packaged analytic application at the same time or shortly thereafter to obtain the full value of their new operational system. Consequently, the market for packaged operational applications has accelerated the market for packaged analytics.

The Mainstream Is Ready!

Mainstream Users Demand Complete Solutions

At the same time, the business analytics market has evolved from an early adopter market to a mainstream one. Gartner DataQuest estimates that the market for business analytic tools will grow from $9 billion to $18.5 billion in 2005.[3] These figures indicate that business intelligence has infiltrated a majority of large organizations.

Although early adopters are willing to spend the time and money to integrate disparate products and technologies, mainstream users demand complete solutions delivered quickly at low cost. These organizations may lack the internal technical skills to develop complex IT solutions, have small budgets for IT-related expenditures, and possess a risk-averse culture that prefers buying solutions to building them. These mainstream users are ripe for packaged analytic applications.

[3] "News Briefs," DM Direct, October 2001

Evolution of Operational and Analytic Applications

		Operational Applications	Analytic Applications
Phase 1	Programming Languages	e.g., Assembler, Cobol (1960s/70s+)	e.g., Focus, Ramis (1960s/70s+)
Phase 2	Tools	• CASE tools, Graphical Languages (3GL and 4GL) (1980s+) • Developer workbenches, object-oriented application development environments (ADEs) (1990s+)	• Mainframe EIS/DSS tools (1980s) • Desktop tools for reporting, OLAP, and data mining (early 1990s) • Integrated analytic suites (1990s+) • ETL and meta data tools for data warehouse development (1990s+)
Phase 3	Packaged Applications	• Back-office applications (e.g., SAP, PeopleSoft) (1980s); • Front-office applications (1990s)	• Packaged analytic applications, (front- and back-office) (e.g., Informatica, NCR—Teradata, Cognos) (2000+)
Phase 4	Application Development Platforms	• Web application servers (e.g., BEA WebLogic, IBM WebSphere) (late 1990s)	• Analytic development platforms (e.g., arcplan, MicroStrategy, ProClarity) (2000+)

Illustration 2. The evolution of business intelligence has closely mirrored the evolution of operational applications, albeit five to 10 years behind.

Enterprise Deployments. But, even early adopters now want to go "mainstream" by deploying business analytics on an enterprise or extraprise scale. They want to deliver business intelligence capabilities to all knowledge workers, including operations workers, customers, and suppliers. In the current economic and competitive climate, they also want to avoid expensive and time-consuming software deployments.

The Majority Of Users Want Applications, Not Tools!

The problem with deploying analytics to the enterprise is that the "new" generation of users has fewer technical and analytical skills than "power users" or business analysts, who are the primary users of analytic tools today. The typical knowledge worker has little patience for learning how to master a tool or crunch data. He or she may not remember how to find relevant reports in a directory structure or locate relevant data within the reports once he or she finds them. Some may not even know how to interpret the data or what to do about it!

The New Knowledge Workers. In short, this new generation of users requires a new generation of tools—or, more accurately—an *application* that embeds analytics into the fabric of the processes and tasks that they manage on a daily basis, and that consume the lion's share of their attention. They want analytics to be intuitive and seamless. They want an analytic application that transparently provides the information they need, when they need it, with the means to do something about it.

IT Needs Help To Deliver Complex Enterprise Analytic Applications

But writing and maintaining analytic applications from scratch is a daunting task. Even the most well funded IT departments need assistance. The advent of packaged analytics and application development platforms take most of the pain—time and cost—out of deploying analytic applications.

Deploying Analytic Applications

If you are now convinced that you need an analytic application, you are not alone.

Two-Thirds Build Analytic Applications Today

The majority of our survey respondents said they either have deployed an analytic application or are planning to. (See illustration 3.) Almost two-thirds (62 percent) of those have

built an analytic application, while one-third (34 percent) have purchased one or are planning to. (See illustration 4.)

(Survey respondents were given the same definitions for packaged and custom analytic applications as listed in the *"Definitions" Sidebar.*)

Analytic Applications

"Has your group deployed either a packaged or custom analytic application or planning to soon?"

- Yes (84%)
- No (9%)
- Not sure (4%)
- Does not apply (4%)

Build versus Buy

"Did your group primarily "Build" or "Buy" its analytic application?"

- Build (62%)
- Buy (34%)
- Not sure (4%)
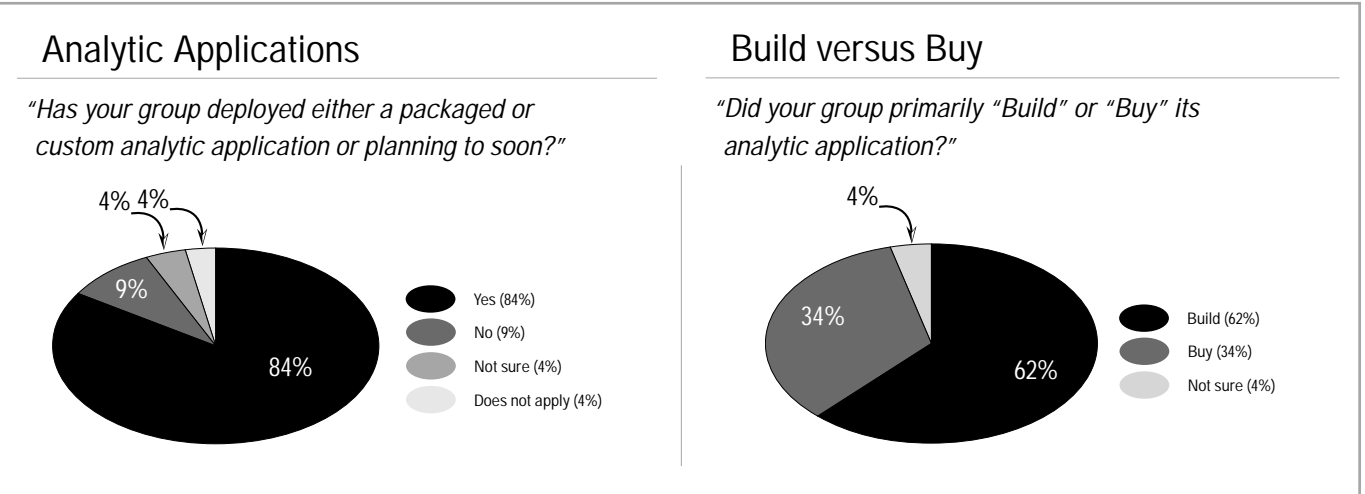
Illustration 3. The vast majority of respondents have deployed an analytic application. Based on 578 respondents.

Illustration 4. Almost two-thirds of respondents said they have built an analytic application, and one-third have not. Based on 483 respondents.

Overall, the most commonly deployed analytic applications support finance and accounting functions, followed by sales, marketing, and customer relationship management.

Business Areas. Interestingly, organizations are deploying custom and packaged analytic applications to business areas in roughly the same percentages. Organizations appear slightly more likely to build rather than buy analytic applications to support CRM and customer service. (See illustration 5.)

Analytic Applications Are Most Often Deployed In Finance

Seven Criteria for Evaluating Analytic Applications

Before you deploy an analytic application, you need to know what differentiates a good analytic application from a poor one. In the end, the decision to build or buy an analytic application is not as important as your team's ability to execute and deliver value to the business, whatever approach used.

This section describes seven characteristics that every analytic application should possess.

1. Supports the BI Lifecycle
2. Embeds Domain Expertise
3. Designed for All Users
4. Supports Decision Processes
5. Supports Versatile Analytics
6. Supports a Robust BI Architecture
7. Integrated with the Enterprise

What Business Areas Does Your Analytic Application Support?

Business Area	"Build"	"Buy"
Finance/Accounting	55%	53%
Sales/Orders	47%	44%
Marketing	46%	47%
CRM	40%	33%
Customer service	37%	27%
Strategy/Performance (e.g., scorecards)	36%	33%
Industry specific	31%	29%
Supply chain	23%	23%
Human resources	19%	21%
E-commerce	17%	19%
Manufacturing	12%	14%
Other	13%	14%

Illustration 5. Organizations are deploying packaged and custom analytic solutions in roughly the same business areas. Based on 481 respondents.
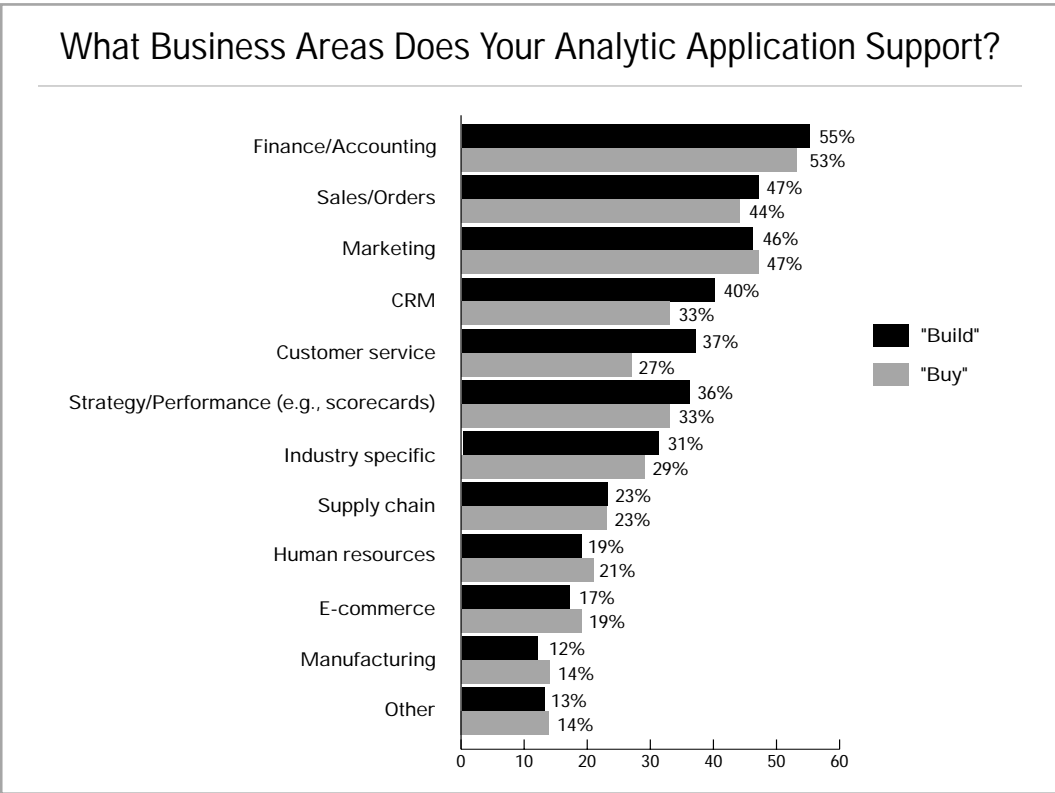
Once you understand the basic characteristics of an analytic application, you can then decide whether to build or buy an application, which is the focus of the next section.

1. Supports the Business Intelligence Lifecycle

The most complete analytic applications support every phase of the business intelligence lifecycle. (See illustration 6.) That is, the analytic applications enable organizations to capture data (data warehouse), analyze the data (analytic tools), develop plans (models, rules), take action (execute against operational systems), and review and measure the results.

Analytic Applications Should "Close the Loop"

Circular Process. Ideally, the analytic application supports a closed-loop process, as indicated by the circular nature of the lifecycle diagram below. Many analytic tools focus on one or two of the steps, in particular "capture" and/or "analyze." However, the best analytic applications enable users to develop plans, act on them, and then evaluate their effectiveness.

For example, a good customer relationship management (CRM) application enables users to create models of customer behavior, develop a campaign, download customer lists, and run the campaign by sending lists and rules to email broadcasting services, Web personalization applications, and direct mail houses. Organizations then close the loop by collecting response data and evaluating the campaign's effectiveness or lift against predefined goals.

In many business processes, it isn't realistic for the analytic application to directly support the "act" step. The analytic application simply needs to offer tight linkages to other applications or infrastructure components to complete the cycle. The analytic application needs to have open
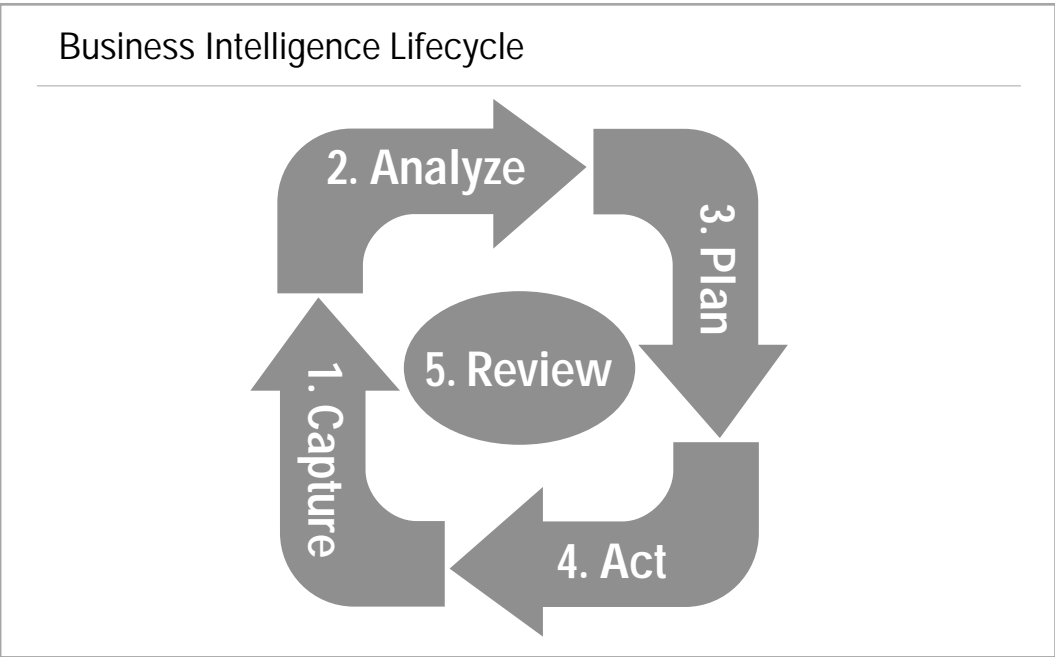
Business Intelligence Lifecycle

Illustration 6. The business intelligence lifecycle is comprised of five steps: capture (data), analyze, plan, act, and review.

interfaces to exchange information—in batch and real time—with other applications or databases that are part of the business process. (See #6, "Supports a Robust BI Architecture" on page 17.)

2. Embeds Domain Expertise

An analytic application is not a generic analytic tool. It embeds knowledge of one or more specific domain areas in its data model, reports, metrics, key performance indicators, and closed loop processes. The domain knowledge of specific analytic applications is listed in illustration 7.

Categories of Analytic Applications

	Business Area	Analytic Applications
Front Office	Sales, orders	Territory management, sales performance and pipeline, revenue optimization, bookings to billings, and fraud detection.
	Marketing	Campaign and promotions analysis: customer segmentation, profiling, churn, profitability, and lifetime value analysis.
	Call center, customer service	Call center utilization, call center optimization, and customer satisfaction.
	E-commerce	Purchasing trends, Web site traffic, promotions, advertising, affiliate marketing, and cross-channel sales.
Back Office	Manufacturing	Defect analysis, labor costs, capacity optimization, and demand planning.
	Supply chain	Shipping, distribution analysis, inventory control, and fulfillment.
	Finance	Financial reporting, consolidation, budgeting, scorecards, asset management, risk management, loss prevention.
	Human resources	Labor utilization, compensation planning, work force optimization, and insurance analysis.

Illustration 7. The most common analytic applications by major business areas. Vertical industry analytic applications are too numerous to list but include the above applications tailored to each industry.

Packages Versus Starter Kits

Acquiring Domain Expertise. It is not easy for vendors to acquire this domain expertise. It usually takes a number of years working with customers on specific types of applications to develop the requisite knowledge to create domain-specific data models. Or, vendors hire domain experts to develop, sell, and maintain the analytic applications. Be sure to inquire how your vendor obtained its domain expertise.

Vendors embed domain expertise in slightly different ways. Analytic packages embed domain knowledge in the data model, reports, and decision processes supported. This allows vendors to deliver packages that are focused on a specific business area or domain, such as supplier performance or customer profiling. Analytic development platforms, on the other hand, don't supply data models, but they often provide report templates or "starter kits" that provide common types of reports in a given domain.

3. Designed for All Types of Users

Unlike analytic tools of the past, which have been geared primarily to tech-savvy users, analytic applications don't deserve the label unless they geared to ALL users.

This is a tall order for vendors because there is a wide range of users in every organization. (See Sidebar "Types of Analytic Users" on page 15.) An analytic tool that appeals to sophisticated number cruncher may be an anathema to executives or managers.

Dynamic Customization At A Granular Level

Customization. The best analytic applications can be highly tuned to meet the needs of individuals and groups in an organization. These applications can be dynamically customized to accommodate individual roles, tasks, technical literacy, analytical ability, business knowledge, and decision-making styles.

This granular level of customization is critical since there may be a wide range of analytic abilities and preferences even within a relatively homogeneous department or group of users. In addition, it is often impossible to pigeonhole users since many play different roles at different times each day. And each role requires different levels of analytic access and functionality. Thus, it's important that administrators profile the analytic abilities of business users. (See illustration 8.)

Creating Analytic Profiles

User Analytic Profile
A. User Name: _____
B. Group or department: _____
C. Primary role: _____
D. Primary tasks: _____
E. Current decision making style: _____
F. Types of reportd currently used: _____
G. Rate the users analytic abilities on scale of 1 to 5:

Technical literacy:	1	2	3	4	5
Analytic ability:	1	2	3	4	5
Business knowledge:	1	2	3	4	5

Illustration 8. The first step in customizing an analytic application is to document the analytic abilities of business users. This can be done using an instrument like the one above.

Dynamic Customization Requires A Granular Object Model

The administrators then apply security and access control settings to a granular component object model to customize the analytic applications. This lets them control everything that individual users see and do in an analytic application. For example, administrators can hide ad hoc query functions and sophisticated analyses (e.g., quadrant charts) from casual users, but expose them to power users.

Personalization. From there, individuals should be able to personalize the analytic application to accommodate their individual tastes and preferences. The first level of personalization is done via a "portal" type interface that lets users establish personal report folders, subscribe to various "services" or reports, and change colors and fonts, among other things.

In addition, users should be able to create personalized views of the reports and metrics that they need to analyze on a regular basis, says DecisionWorks' Schmarzo. For example, a product manager might want to display a top-line chart that tracks the performance of his or her products and compares them to others in the category. Or a regional sales manager might want to see metrics about his or her territory at the top of the dashboard and other territory data only when drilling down.

Types of Analytic Users: Macro Definitions

Our industry typically lumps users into several broad analytic categories, listed below. These profiles are only a starting point for customizing analytic applications. The numbers in parentheses represent the percentage of survey respondents who indicated that their analytic applications support that category of analytic user.

Executives. Executives need high-level, graphical views of organizational performance (e.g., dashboards or scorecards) with the ability to drill into more detail if needed. The tools should automatically alert them if performance falls outside expected ranges. (65 percent).

Managers. Like executives, managers are casual information users who review trending reports daily or weekly depending on the activity. Because they oversee specific business processes, they need to drill into detailed data more frequently than executives to explore the causes of problems or the feasibility of new opportunities or plans. (76 percent)

Business Analysts. These are the proverbial "power users" who spend most of their time crunching data to develop sophisticated analyses, such as forecasts and plans. These users need the most sophisticated analytic tools and unfettered access to corporate databases. (78 percent)

Report Developers. These are second-tier power users who have learned enough about an analytic tool to become designated as the de facto report writer for the department in which they work. These users need authoring tools with all the bells and whistles. (The survey didn't break out this category.)

Customers/Suppliers. These casual information users need to manage business relationships, which include checking the status of orders, invoices, proposals, etc., and tracking their activity or performance over time. (Customers - 20 percent, Suppliers - 11 percent)

Operations Workers. These are front-line personnel, such as quality inspectors, customer service representatives, and factory floor managers. These workers need information and recommendations for action in real time, usually within the context of another application or delivered via wireless or hand-held devices. (27 percent)

4. Supports Decision Processes

We mentioned earlier that one of the trademarks of an analytic application is that it is process-oriented. Specifically, this means that an analytic application embeds support for decision-making processes.

Classes of Decision Processes. Since most decisions are not made in a vacuum, it is imperative that analytic applications support the many ways that users work individually and collectively to make decisions. Below are six types of processes that facilitate decision making.

An Analytic Application Should Facilitate Decision-Making Processes

- **Procedural.** An analytic application may present business users with a predefined sequence of reports to guide them in their analysis of specific problems or functional areas.

- **Contextual.** An intuitive graphical interface will present users with several "drill" paths for further discovery based on the context of their questions or current view of the data. Vendors and analysts often refer to contextual and procedural processes as "guided analysis."

- **Collaborative.** Users often share information before acting on it. Thus, analytic applications should support collaborative processes, such as the ability to publish and subscribe to reports, annotate and email reports, create workflows for sharing reports, and engage in threaded or real-time online discussions or chats.

- **Event-driven.** Getting the right data at the right time to take action is a critical analytic process. Alerts and broadcast/multicast servers that can push information to users in near real time across multiple, user-selected channels (i.e., Web, pager, cell phone, hand-held, desktop) are critical features of an analytic application.

- **Transactional.** For well-known business processes, such as inventory replenishment, organizations should be able to drive transactions or database updates from within analytic applications via interfaces to operational systems or by using intelligent agents.

- **Evaluative.** To close the loop, firms need to evaluate the effectiveness of their analytics and decisions. Analytic applications should embed self-reflective measurement processes.

Select Decision Processes. In terms of specific processes, a majority of organizations today (64 percent) provide users with a predefined sequence of reports, followed by publishing and subscribing to reports (48 percent), annotation (47 percent), and alerts (41 percent). (See illustration 9.)

Companies plan to add support for many decision processes in 18 months, but most especially measuring the effectiveness of decisions (44 percent), agents (40 percent), publish/subscribe (39 percent), and alerts (39 percent).

5. Supports Versatile Analytics

Analytic applications must provide analytic functionality appropriate to the task. They should not try to solve all problems with one type of tool. This means that analytic applications need to support a wide range of analytic functions and visualization techniques, such as those listed in illustrations 9 and 10.

Statistical Analysis And Predictive Modeling Will Increase In The Next 18 Months

Analytic Functions. Not surprisingly, most survey respondents said their analytic applications today support basic analytic functions: prompted and user-modifiable reports (83 percent to 72 percent, respectively), OLAP navigation (76 percent), and ad hoc queries (75 percent). About one-third plan to add more sophisticated statistical analysis and predictive modeling capabilities in the next 18 months.

Decision-Making Processes

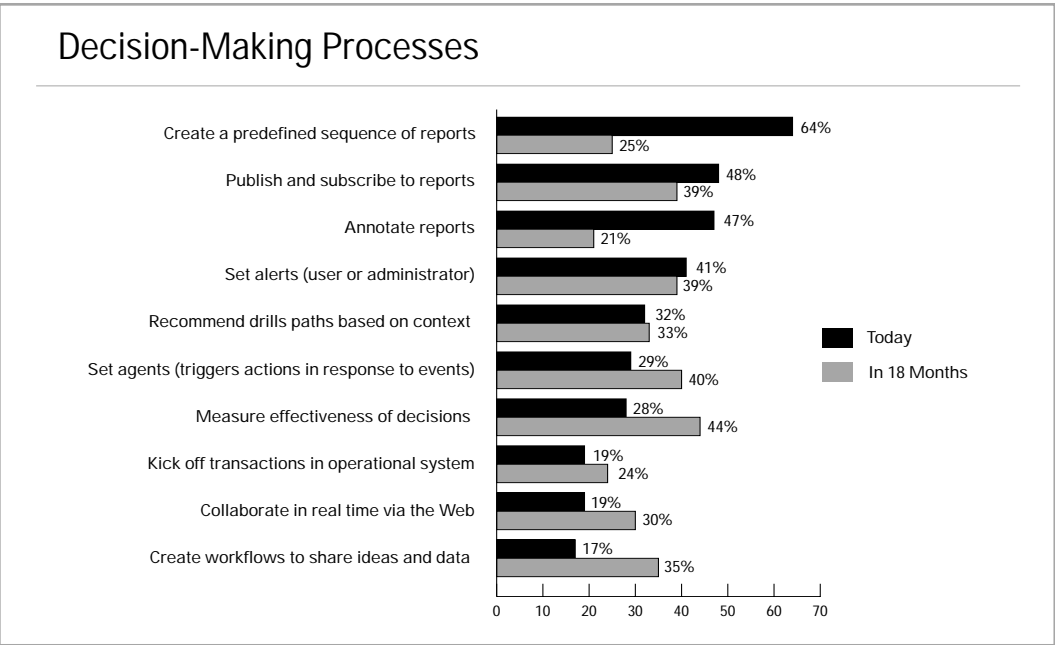| Process	Today	In 18 Months
Create a predefined sequence of reports	64%	25%
Publish and subscribe to reports	48%	39%
Annotate reports	47%	21%
Set alerts (user or administrator)	41%	39%
Recommend drills paths based on context	32%	33%
Set agents (triggers actions in response to events)	29%	40%
Measure effectiveness of decisions	28%	44%
Kick off transactions in operational system	19%	24%
Collaborate in real time via the Web	19%	30%
Create workflows to share ideas and data	17%	35%

Illustration 9. Current and planned support for select decision-making processes. Based on 465 responses

Analytic Functions

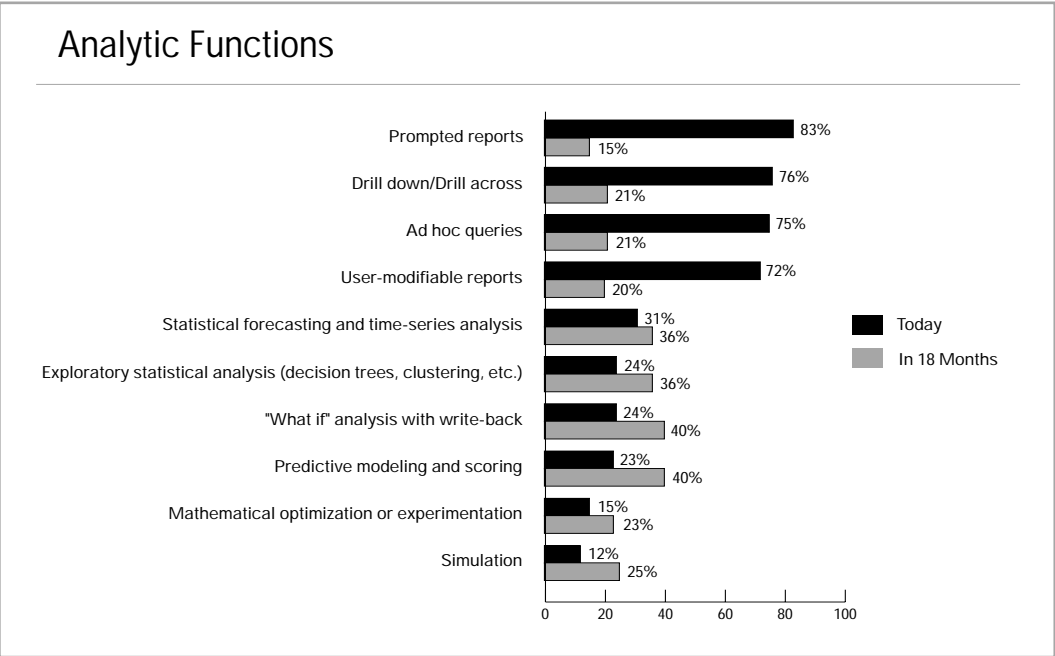| Function	Today	In 18 Months
Prompted reports	83%	15%
Drill down/Drill across	76%	21%
Ad hoc queries	75%	21%
User-modifiable reports	72%	20%
Statistical forecasting and time-series analysis	31%	36%
Exploratory statistical analysis (decision trees, clustering, etc.)	24%	36%
"What if" analysis with write-back	24%	40%
Predictive modeling and scoring	23%	40%
Mathematical optimization or experimentation	15%	23%
Simulation	12%	25%

Illustration 10. Analytic applications today deliver bread-and-butter query, reporting, and OLAP functions, but will strike out into statistical analysis in the next 18 months. Based on 465 responses.

Visualization Functions. Most analytic applications today provide basic charting and graphing capabilities, but will begin offering more advanced techniques, such as dashboard graphics and real-time charts or monitors within 18 months. (See illustration 11.) These and other advanced visualization features enable users to quickly detect patterns and exceptions, especially when analyzing large volumes of data or statistical output.
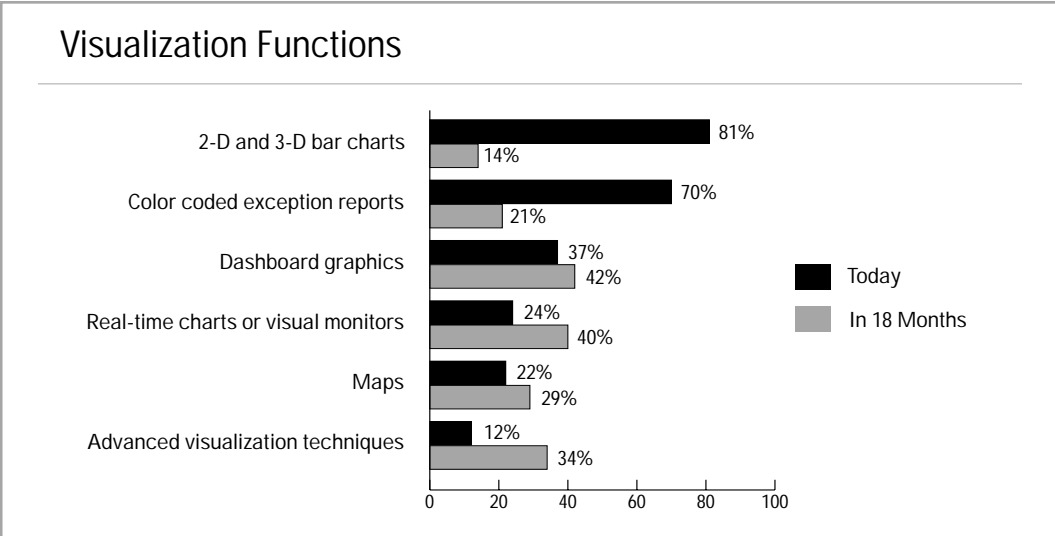
Illustration 11. Analytic applications today provide basic charting and graphing capabilities, but will begin offering more advanced techniques within 18 months. Based on 350 responses.

6. Supports a Robust Business Intelligence Architecture

Just as analytic applications need to support the complete BI lifecycle, they also need to support a complete BI architecture. In fact, the two go hand in hand. TDWI uses the BI lifecycle to segment architectural components. (See illustration 12.)

- **Capture:** Data warehouses, data marts, staging areas, and data models and the tools to build them. These include data modeling, profiling, quality/cleansing, extraction, transformation, load (ETL), meta data management, data source adapters, syndicated data, and movement tools. The two most important outputs of this "back-end" BI architecture are a robust, adaptable data model that broadly integrates data across functional areas and high-quality data devoid of inconsistencies, omissions, and other defects.

- **Analyze.** Analytical tools and servers to support query, reporting, OLAP, data mining, text analysis, statistical analysis, visualization, and portals.

- **Plan.** Analytic applications that incorporate planning, modeling, or rules-generation capabilities using analytic tools and collaborative decision processes.

- **Act.** Operational data stores and various interfaces to operational systems, such as triggers, agents, real-time messages, or application calls to send analytic data to operational systems and capture results.

- **Review.** Analytic applications that generate reports to evaluate the effectiveness of plans or decisions.

7. Integrated with the Enterprise

The final characteristic of an analytic application is that it must integrate with other business intelligence systems in the enterprise.

Maintaining A Consistent Architecture Is Difficult

The danger with analytic applications is that it can wreak havoc on a well planned corporate IT architecture. Analytic packages and development platforms now make it very easy for business
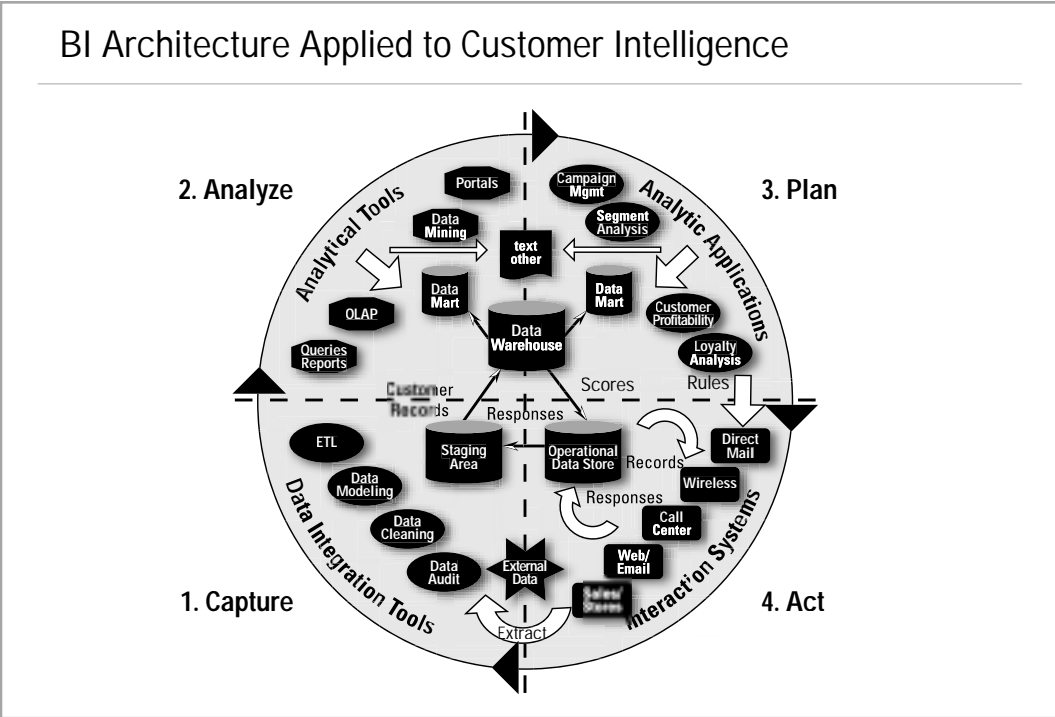

Illustration 12. The above diagram shows BI architectural components within the context of the BI Lifecycle applied within a CRM context. From TDWI's "Customer Intelligence Lifecycle" poster, 2001.

units to deploy systems quickly that may not conform with an enterprise data model or corporate standards for platforms, tools, and services. The analytic application may uniquely model business metrics and references and extract data outside of a corporate data warehouse. This creates inconsistency and undermines efforts to create a single version of the truth within the enterprise.

Analytic packages with proprietary data models are particularly prone to creating "analytic silos" or "independent data marts" as they are sometimes called. Ideally, you should be able to modify the data model to run against an existing data warehouse. In reality, this usually emasculates the package to one degree or another. The best you can do is make sure the package extracts data from the data warehouse and not directly from source systems. Meta data can then be used to map and synchronize between the data warehouse and packaged data models.

Federation. This type of "after-the-fact" integration strategy is part of what some call a federated business intelligence architecture. This approach uses staging areas, meta data, database views, and a variety of other technical devices to integrate disparate analytic systems. The key to a federation strategy is to encourage groups to share dimensions, facts, rules, and data as much as possible when building or renovating new analytic systems.

One technical strategy is to backfill a common staging area behind non-integrated analytic systems. This allows the silos to draw data from the same set of data that has been consistently modeled. A meta data repository can then map or synchronize the differences between source and target analytic systems or even multiple, daisy-chained staging areas. (See illustration 12.)

Another strategy is to create an "integrated view" of the disparate analytic systems. This type of meta data integration can be done logically or physically. On the logical side, you can
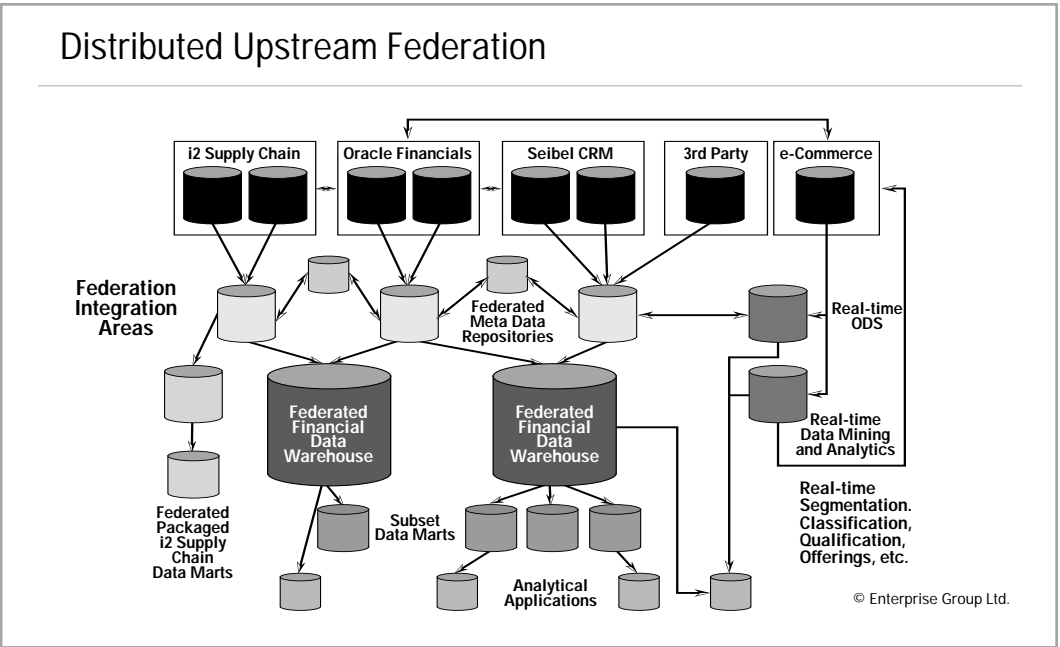
Distributed Upstream Federation

Illustration 13. The above slide depicts one of many ways to integrate dissimilar analytic systems in a federated architecture. Courtesy of Enterprise Group, Ltd.

deploy a business analytic tool with a rich semantic layer that homogenizes the data in back-end systems. On the physical side, you can create a separate data mart that extracts and integrates the data from the disparate analytic systems for users who need to query across dis-integrated systems.

"The goal of a federated approach is to deliver the greatest amount of architecture given the political realities and constraints of your organization," says Doug Hackney, president of Enterprise Group, Ltd. who has spoken widely on the subject of analytic federation. [4]

The Emerging Decision: Build or Buy?

In many respects the decision to build or buy a packaged analytic application is no different from the "make/buy" decision that companies have wrestled with for operational applications (e.g., SAP or PeopleSoft) or other mainstream information technologies.

However, one difference is that the market for packaged analytic applications is still young; mainstream analytical vendors first began shipping packages less than two years ago. Therefore, it is not surprising that organizations in our survey are building rather than buying analytic applications by almost a 2:1 margin compared to buying them. (See illustration 4.)

However, this doesn't mean that most companies are not actively looking to purchase analytic applications. Only one-quarter of firms that have "built" analytic applications (23 percent) "never considered" buying a packaged solution. This means the rest (77 percent) have looked for a package but couldn't find one that met their needs.

[4] For more information on federation, see Doug Hackney's Web site at www.egltd.com.

"I've never seen anything out of the box that gives us what we want," says Rick Stevenson, director of financial systems and supply chain, at GAF Materials Corp. in Wayne, New Jersey.

Reasons Not To Buy. Lack of functionality and cost are the primary reasons companies decide not to buy an analytic application, according to our survey. At least half cited "missing functionality" (52 percent) and the "cost and time to customize" (50 percent) as reasons for rejecting analytic packages. A slightly smaller percentage found the solutions "too expensive" (41 percent), "not integrated with existing architecture" (37 percent), "not mature" (34 percent), or inflexible (34 percent). (See illustration 14.)

"The cost and time to customize is the real potential show-stopper for packaged analytics," says DecisionWorks' Schmarzo. "Vendors really need to step up to the challenge of improving the meta data management and administration tools that guide customers through the process of customizing and extending the package."

Why Not Buy a Packaged Analytic Application?

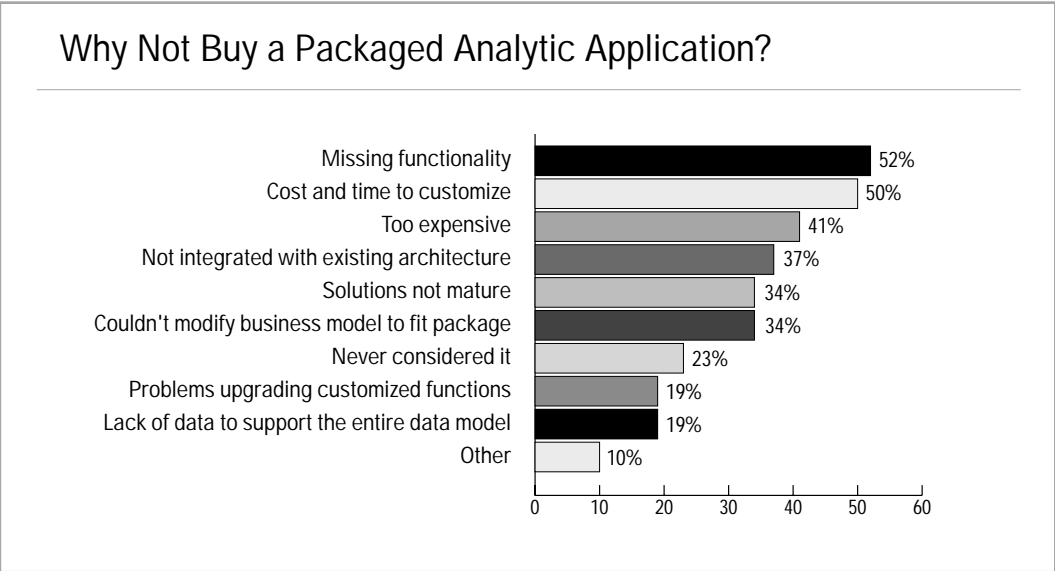|	
Missing functionality	52%
Cost and time to customize	50%
Too expensive	41%
Not integrated with existing architecture	37%
Solutions not mature	34%
Couldn't modify business model to fit package	34%
Never considered it	23%
Problems upgrading customized functions	19%
Lack of data to support the entire data model	19%
Other	10%

Illustration 14. Missing functionality and high cost are the primary reasons cited by organizations that have not purchased packaged analytic applications. Based on 301 respondents.

Growth on the Horizon. Despite these objections, the market for packaged analytics appears to have a bright future. Many organizations that have rejected packaged solutions will reevaluate them within 18 months. Most respondents seem to recognize that packaged analytic solutions will evolve considerably in the next several years. There will be offerings in more subject areas and specialized, industry niches, and the applications will provide greater functionality, scalability, adaptability, and robustness.

The number of organizations that are either "interested" or "very interested" in purchasing packaged analytic applications will jump from less than half (47 percent) today to almost two-thirds (62 percent) by 2004, a significant increase. Moreover, the negative ratings for packaged analytics will drop even more. The number of organizations that are "not very interested" in purchasing packaged analytics will drop from 43 percent today to 19 percent by 2004. (See illustration 15.)

"Our business wants to dramatically reduce costs while speeding the deployment of new systems," says an IT manager at a specialist insurance firm in Europe. "We believe that packages can satisfy these requirements and offer greater flexibility to meet new business needs. Unfortunately, we have looked for insurance-specific analytic packages, but have not found any yet."
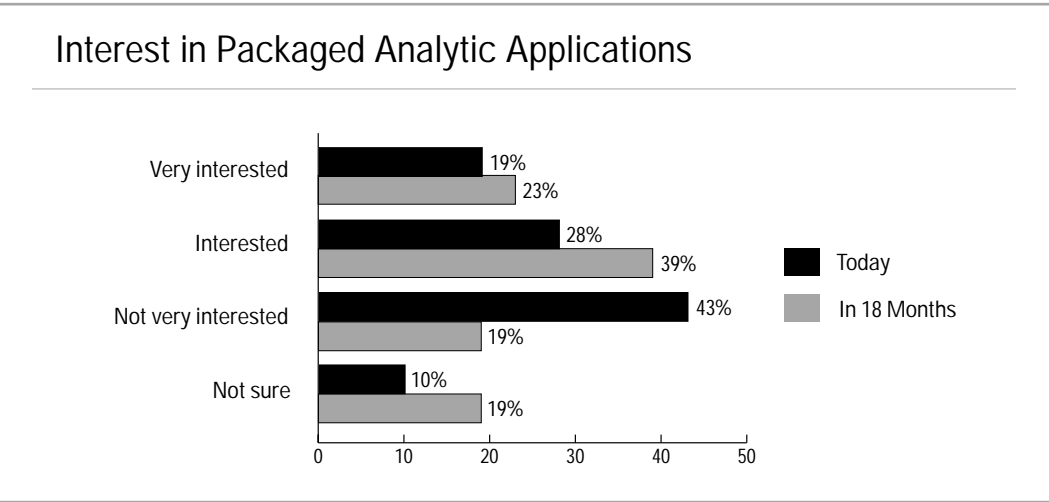
Interest in Packaged Analytic Applications

Category	Today	In 18 Months
Very interested	19%	23%
Interested	28%	39%
Not very interested	43%	19%
Not sure	10%	19%

Illustration 15. Interest in packaged analytic applications will grow by 2004. Based on 569 respondents.

The Build Option

To Code Or Not To Code? Today, most organizations that build custom analytic applications use a combination of analytic tools and hand-written code. (See illustration 16.) Most developers write code to enhance or customize the output of an analytic tool. In contrast, about one-third of organizations build analytic solutions without using an analytical tool.

Analytic Development Tools

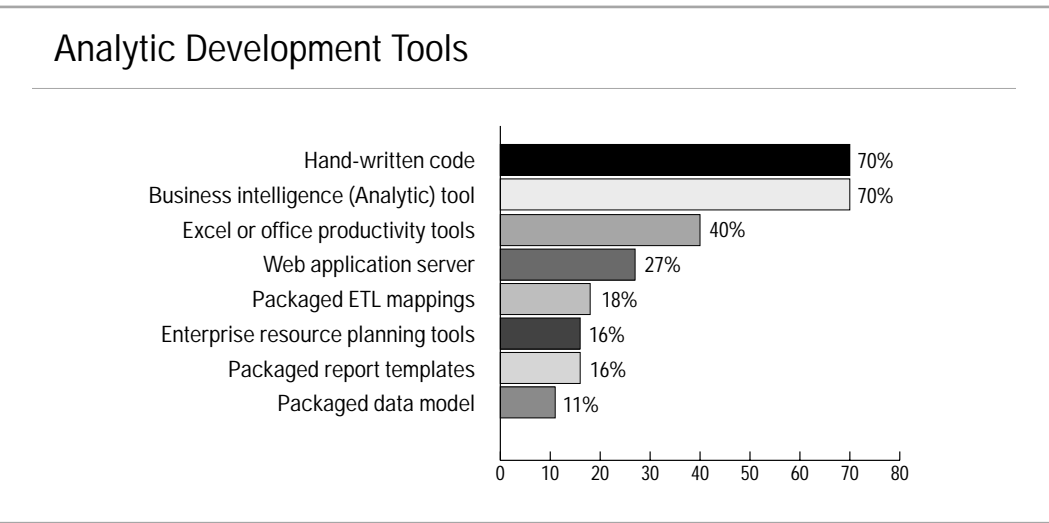| Tool	Percent
Hand-written code	70%
Business intelligence (Analytic) tool	70%
Excel or office productivity tools	40%
Web application server	27%
Packaged ETL mappings	18%
Enterprise resource planning tools	16%
Packaged report templates	16%
Packaged data model	11%

Illustration 16. Filtering the above data shows that 64 percent of companies use both hand-written code and an analytic tool to build custom analytic solutions. Based on 252 respondents.

What is surprising, however, is the amount of code that developers write to enhance the output of analytic tools. Almost half (46 percent) of organizations with analytic tools reported that their developers had coded at least 50 percent or more of their analytic applications. (See illustration 17.) This clearly indicates that most analytic tools on the market today are not *development platforms*.

Hand-Written Code

- 50+% hand coded (46%)
- 30-40% hand coded (19.5%)
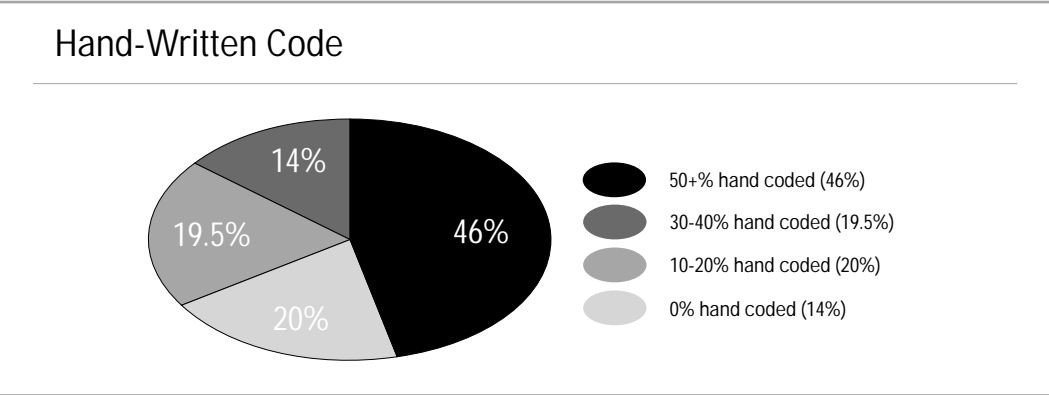- 10-20% hand coded (20%)
- 0% hand coded (14%)

Illustration 17. Almost half (46%) of respondents who build analytic applications hand code 50% or more of the application. Based on 210 respondents.

Fortunately, several vendors, including several sponsors of this report, are beginning to offer a new breed of analytic tool that provides a graphical development environment that minimizes coding when creating custom analytic applications. Most of these *analytic development platforms* run against multidimensional databases, such as those from Microsoft, Hyperion, and Oracle, but a growing number also work directly against relational data in whole or in part. (See sidebar "Analytic Development Platforms.")

Consultants. A majority of companies enlist outside assistance when building an analytic solution. Most commonly, organizations team their in-house developers with those from a systems integrator or consultant (43 percent) followed by business analytic vendors (13 percent.) Teams outsourced development in only 7 percent of the cases. More than one-third of organizations (37 percent) developed the analytic application entirely in house.

Pros To Building

Why do organizations choose to build rather than buy analytic applications in 2002?

Functionality. The answer is overwhelmingly straightforward: companies want to obtain the functionality they need. This was cited by an overwhelming 84 percent of "build" respondents. (See illustration 18.)

The build approach lets companies customize every aspect of an analytic application, from the user interface to calculation scripts to report content, sequence, and formatting to interfaces with secondary applications. This gives business users the functionality they need with a familiar or highly customized interface.

"We built a custom wrapper around our analytic tool so that when a user logs on to our site, they don't see the tool, they see their business laid out for them as they understand it," says Wes Flores, a senior technology manager at Verizon Long Distance in Dallas.

Analytic Development Platforms

If you don't want to buy an analytic package but can't afford to dedicate programmers for several months to write custom code, you may be in luck. There is a new breed of business analytic tool that is designed from the ground up as a rapid application development environment for building custom analytic solutions. Called *analytic development platforms*, these tools offer "plug-and-develop" capabilities that enable developers— or even savvy business users—to build sophisticated applications with a unique look, feel, and functionality in a matter of days or weeks.

"Our [analytic development platform] is very easy to use and requires no coding," said GAF's Rick Stevenson, "I had a request for a significant enhancement yesterday and I built the new functionality in one hour."

Analytic development platforms typically provide an extensive set of components that developers can drag and drop onto a graphical workbench that facilitates WYSIWYG development. The client and server components can be easily customized using pop-up dialogue boxes and options for creating scripts, if needed. (See illustration S1.) Many analytic development platforms also come with predefined models and reports that developers can leverage to accelerate development.

Analytic Development Platforms

Most analytic development platforms run against multidimensional databases, such as those from Microsoft, Hyperion, and Oracle, but a growing number also work directly against relational data in a data warehouse or data mart. Most support sophisticated query engines that can dynamically display from disparate systems as distinct objects (i.e., charts, tables, or graphs) in a single report on the user's screen.

Illustration S1. Analytic development platforms provide a component-based graphical environment to rapidly develop custom analytic applications with minimal coding.

Extensibility. Developers can also extend custom applications as user requirements change or expand since they are familiar with the code or development tools. This may not be as easy with packages. Extensibility is critical in the early stages of deployments where users often submit many requests for changes, as well as in highly volatile business environments where user requirements change frequently.

Strategic Value. To a lesser extent, companies also choose to build analytic solutions because the application is strategic (55 percent) or complex (48 percent). In the first case, a company believes the application can give it a competitive advantage; therefore, it doesn't want to buy an off-the-shelf solution that its direct competitors can purchase and deploy as well. In the second case, an organization believes the application is mission critical and wants to deliver the highest level of functionality, performance, and reliability as possible.

"How is an organization going to successfully compete if it doesn't customize its analytical applications?" asks Hubert Goodman, director of business intelligence at Cummins, Inc., a

leading manufacturer of diesel engines and parts. "If other decision makers and other engine makers use the same metrics and KPIs that we do and thus see the same strategic opportunities, how can we gain a competitive advantage? The only way is to differentiate the way we make decisions."

Reasons to Build

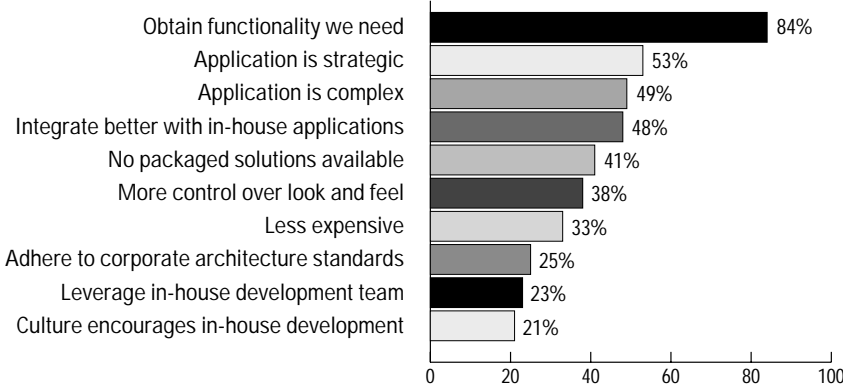| Reason	Percent
Obtain functionality we need	84%
Application is strategic	53%
Application is complex	49%
Integrate better with in-house applications	48%
No packaged solutions available	41%
More control over look and feel	38%
Less expensive	33%
Adhere to corporate architecture standards	25%
Leverage in-house development team	23%
Culture encourages in-house development	21%

Illustration 18. Reasons cited as "very important" for building an analytic application. Based on 247 respondents in a multi-choice format.

Culture and Standards. What's interesting is that few organizations build analytic solutions because the corporate culture prescribes it (21 percent). In addition, few build because they feel compelled to leverage an in-house development team (23 percent) or better adhere to corporate architecture standards (25 percent).

Clearly, firms are choosing to build analytic solutions for functional reasons rather than to adhere to organizational or cultural standards. This is somewhat surprising since the majority of respondents in the "build" camp were likely to be associated with corporate IT (58 percent) rather than business unit, divisional, or departmental groups.

"We'll adopt whatever approach helps us meet business needs more quickly," says the IT manager at a financial insurance firm in Europe.

Cons to Building

At the same time, "soft" organizational issues are bigger challenges than technical issues when building an analytic application.

When you can customize without limit, it becomes very difficult to manage the "triple threat" of time, user expectations, and scope creep (see illustration 19). With developers at their disposal, business users are free to request innumerable features and functions, which increase project scope, making it difficult to finish the project on time and under budget.

Project Risks. Also, as project timelines expand, there is additional risk that user requirements will legitimately change due to mergers, acquisitions, shifts in the executive office, or changes in the business climate. Thus, the longer the custom development project goes on, the greater the chances that it will fail. This drives some organizations to deploy packages instead.

"We will soon implement an analytic package offered by our ERP vendor because the package will be significantly cheaper and quicker to deploy than if we tried to build the equivalent functionality ourselves," said an internal consultant at a large Canadian utility.

Analytic packages, however, are not immune from scope creep either. Many companies have prolonged the implementation of operational and analytic packages because they have insisted on substantially customizing the package. "We say we are going to buy and then we customize the package to death to make it work the way we want," says one data warehousing manager. "Then we realize the folly of our ways when we can't upgrade to the next version."
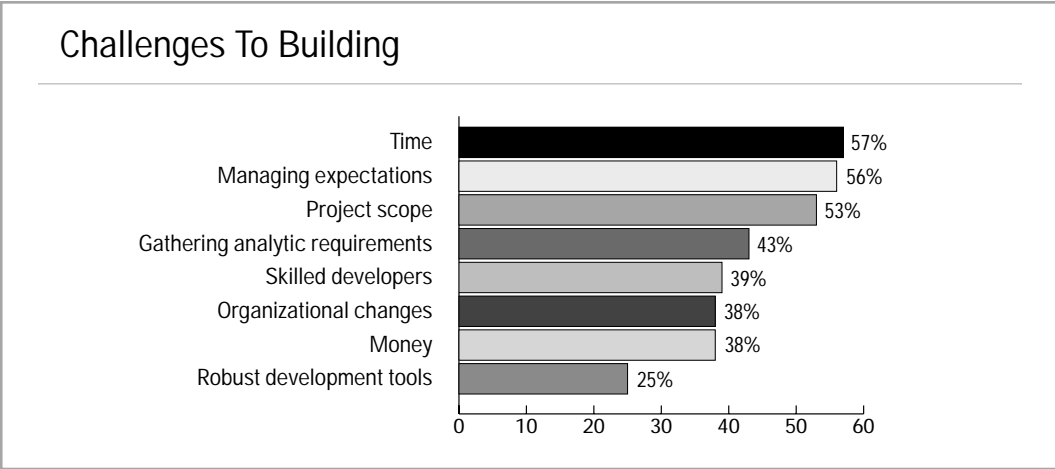

Illustration 19. Items cited as "very challenging" when building an analytic application. Based on 296 respondents in a multi-choice format.

Lack Of Skilled Staff Can Derail A Project

Skilled Staff. Another liability of building analytic applications is the reliance on individual developers. The Gartner Group says the lack of business intelligence skills will be the single greatest inhibitor of growth in the business intelligence industry in the next several years.[5]

Packages And Platforms Will Ease The Skill Shortage

If your organization doesn't have enough skilled people in house to develop and maintain applications, write documentation, and train users, it might be able to hire external consultants or systems integrators to fill the gaps. However, make sure the consultants practice— not just profess—knowledge transfer, so that your staff can take over once they leave.

The new generation of analytic development platforms and packaged applications should ease the skills deficit somewhat. Savvy business users should be able to install and manage analytic platforms and packages.

The Buy Option

Vendor Goal: Be The "SAP Of Analytic Applications"

During the past two years, many vendors have shipped packaged analytic applications to capitalize on the growing demand for complete analytic solutions. The goal of these vendors is to become the "SAP of analytic applications." They want to duplicate SAP's astounding success in the 1990s selling packaged operational applications to Fortune 1000 firms.

[5] Howard Dresner, presenting at TDWI's Business Intelligence Strategies Summit, May 2002.

Integrated Elements. Like SAP, packaged analytic vendors offer integrated suites of applications. These packaged analytic applications integrate a number of elements that organizations currently have to build and integrate on their own:

- A robust data model
- A data warehouse or data mart
- Source data adapters.
- ETL mappings (i.e., against common source applications in a given domain)
- An integrated meta data repository with end-user interfaces.
- A variety of analytic tools and information delivery services.
- Domain-specific reports that incorporate best practice metrics.
- Guided analysis techniques and collaboration features.
- An Internet intelligence infrastructure.

The Data Model Is The Heart And Soul Of An Analytic Package

Packaged Solutions. Not all packages contain all of the above elements, and some contain additional ones. The most complete packages are those that are designed to work off a packaged operational system, such as SAP R/3 or PeopleSoft human resources. Since the source system is known, the vendor can ship source data adapters and ETL mappings to move data from the source system to the target data warehouse or data mart. These analytic packages provide 85 to 95 percent of the final solution.

Data Models. However, whatever the type of package, the data model is the heart and soul of the solution. The data model represents the domain knowledge and expertise that a vendor has gained through numerous client engagements or by acquiring specialized software firms or domain experts.

The data model contains the dimensions, metrics, views, and key performance indicators that form the basis for the application's predefined reports and set the boundaries for end-user ad hoc exploration. The model also dictates what data should be collected and how it should be transformed before loading it into a data warehouse or OLAP server. Thus, it's important to carefully evaluate the breadth and depth of the package's data model before making a purchase.

A Package Can Be Customized But There Are Drawbacks

Customization. It is possible to customize a data model to fit your organization's unique requirements (e.g., reporting requirements, available data, and process models) but it should be avoided, if possible. Since the data model is the foundation of the application, changes create a ripple effect throughout the package. In particular, you will end up having to modify reports and ETL mappings. In addition, customizations may cause problems when you upgrade to a new version of the packaged application.

"The Data Model We Bought Meets 95 Percent Of Our Needs." –Anonymous Data Warehousing Manager

Take It As It Is. The good news is that 20 percent of those organizations that deployed packaged analytics did NOT customize the application at all, and almost half (49 percent) customized less than 20 percent of the package—specifically data models, ETL mappings, and reports. (See illustration 20.)

"The data model in the package we bought meets 95 percent of our needs, and 100 percent with the extension fields," says one data warehousing manager. "But, we aren't embarking on a six- to nine-month requirements gathering exercise either. Since we have five divisions, each will have to adapt as necessary." The same data warehousing manager says he is working with his vendor to create two new additional supply chain modules they need to round out the analytic package.
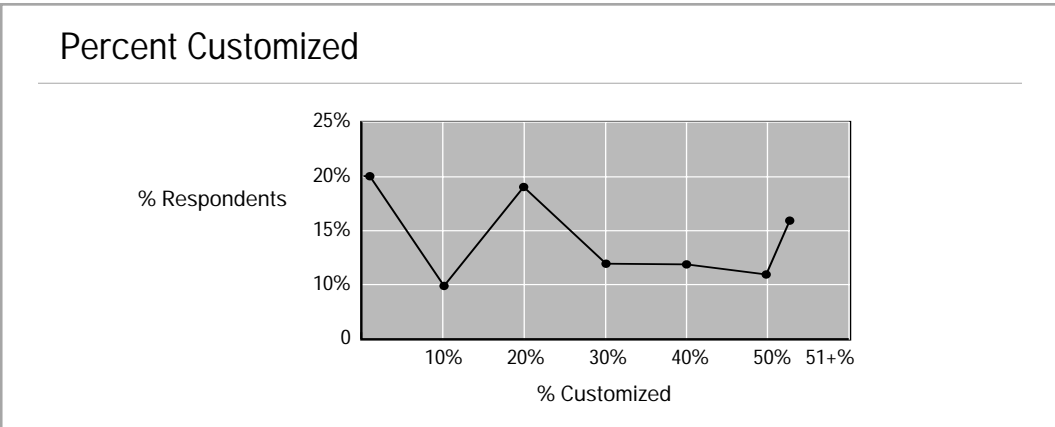
Percent Customized

Illustration 20. Almost half of companies that have deployed packaged analytic applications have customized less than 20 percent of the application. Based on 162 respondents.

Business Analytics Vendors Supply The Majority Of Packages

Sourcing Packages. Most organizations (67 percent) purchase their analytic packages from business analytic vendors, such as those who sponsored this study. Only a handful purchased a package from a systems integrator (8 percent), an ERP vendor (8 percent), a vertical industry specialist (6 percent), a value-added reseller (4 percent), or another source (6 percent).

On the deployment side, organizations rely heavily on systems integrators (40 percent) and business analytics vendors (30 percent) to help their in-house teams deploy analytic packages. Only 18 percent of organizations installed the package without outside assistance, and 8 percent outsourced the entire project to a systems integrator or consultant.

Pros to Buying

Accelerated Deployment Times

The biggest advantage offered by packaged analytics is to accelerate deployment time, according to organizations that have implemented packaged analytic applications. (See illustration 22.)

"We believe that we can cut the time it takes to deploy an analytic application by almost half using a packaged approach, from 12 or 16 weeks to eight weeks," says one data warehousing manager who wished to remain anonymous.

It Takes 8.3 Months To Deploy A Package

Average Deployment Times. According to our survey, it takes organizations an average of 8.8 months to deploy a packaged analytic application. This is higher than we expected but slightly less than the 9.0 months on average that it takes to deploy a custom analytic application.

But, looking beyond averages, almost half of respondents (45 percent) took six months or less to deploy their analytic packages, and 22 percent took three months or less. This shows that many companies are rapidly deploying packaged analytics.

There are several reasons for the higher-than-expected average deployment times for analytic packages. First, there was a small percentage of organizations (13 percent) that took more than 18 months to deploy a packaged application, and this minority pulled down the overall average. (See illustration 21.) These organizations may have encountered cultural, political, or organizational issues that bogged down their projects. Or, they may be piggybacking an analytics package onto the deployment of an operational package, which appears commonplace among SAP customers, for instance. Often the analytic package must wait until the operational package is deployed.

Time to Deploy Analytic Applications

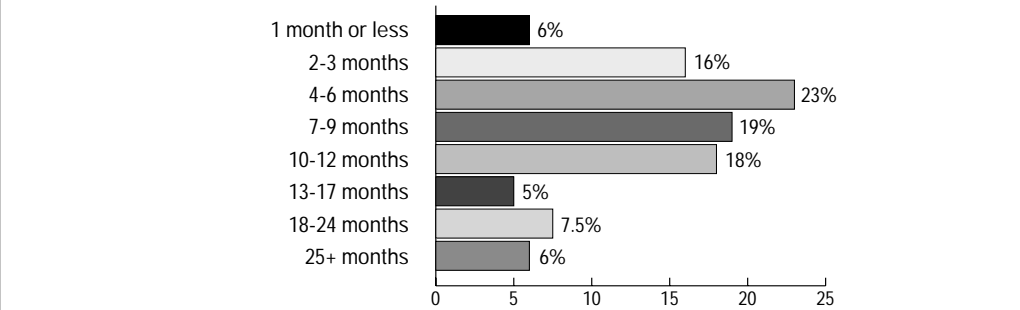**Add A Month If You Have To Build A Data Warehouse**

Illustration 21. Almost half of organizations take six months or less to deploy a packaged application.

Also, the analytic solutions are still maturing along with the services vendors offer to assist users in customizing and deploying them. Clearly, there is a learning curve to implementing and customizing package analytic applications that will eventually increase the speed of deployment.

Minimize IT Resources. It is interesting that the second significant reason organizations deploy packaged analytics is to "minimize use of IT resources." (See illustration 22.) Many business executives view packages as a way to circumvent IT, which they feel is either too busy or too short staffed to meet their analytic needs in a timely manner.

Packages Circumvent IT

"We don't have a big corporate IT group, and we knew that if we tried to build the application, it would take us twice as long and cost almost twice as much," says one data warehousing manager who wished to remain anonymous.
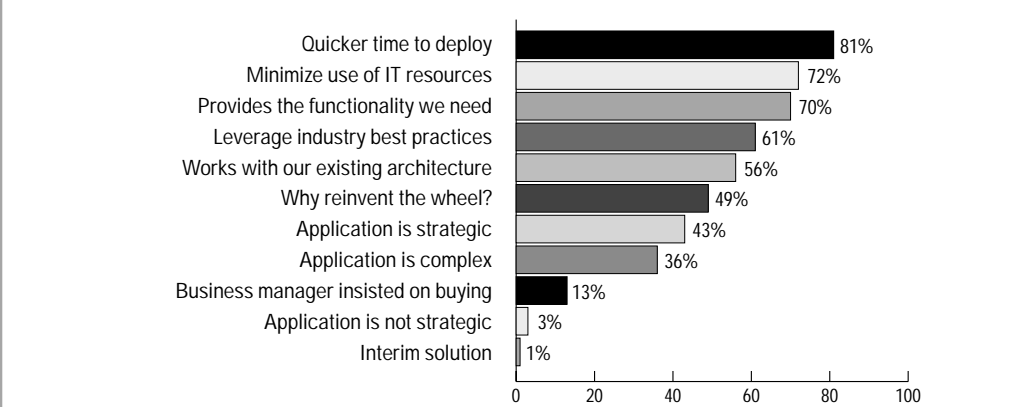
Reasons To Buy

Illustration 22. Quicker time to deploy is the biggest reason to deploy a packaged analytic application. Based on 155 responses.

Outside of deployment times and IT resources, most companies are turning to packaged analytics because they offer sufficient functionality, leverage industry best practices, and

work with their existing architectures. Once all those criteria are met, users quickly deduce that it doesn't make sense to "reinvent the wheel." (See illustration 22.)

A Blessing in Disguise. Although some criticize packages for lacking suitable functionality, some view this deficit as a blessing in disguise. What companies forfeit in functionality, they gain in standardization, consistency, and maintainability.

"We'd like to standardize our business processes since we now have 450 decision makers across the supply chain who could potentially analyze and make decisions 450 different ways," says an IT manager who could not disclose their firm. "Instead of customizing a package to meet these individual needs, we need to take the package and live with it. Although users don't want to change, the organization gets greater consistency and you don't suffer when upgrading to the next version."

Analytic Packages Are Strategic To Organizations

Strategic and Complex. It's also interesting to note what is not motivating companies to implement packages. Although some propose that packages only make sense when implementing tactical, non-competitive applications, our survey data doesn't support this. Almost half (43 percent) said their packaged application is strategic and more than a third (36 percent) said it's complex. Conversely, only 2 percent said the application is not strategic and 1 percent said it is an interim solution.

"Implementing our supply chain analytics package was a no-brainer," says one data warehousing manager. "We didn't even do a formal ROI. We just sold it as a fundamental requirement for doing business. We needed to give users information to do their jobs."

Packages Synchronize Component Upgrades

Upgrade Synchronization. Another advantage of a good analytics package is that the vendor synchronizes the upgrades to all architectural components and elements. This relieves the IT organization of a significant amount of administrative work and a source of thorny problems caused by incompatible product releases from different vendors.

"A good package eliminates compatibility bugs and resulting 'finger pointing' caused when IT departments have to synchronize upgrades among all components in a BI system," says DecisionWorks' Schmarzo.

Cons to Buying

We already addressed the primary disadvantage of buying an analytic application—the cost and time to customize a package. Just as ERP vendors have developed techniques to minimize the cost of customizing packages, we believe packaged analytic vendors will improve in this area over time.

Packages Accelerate Cost Savings And Bottom-Line Benefits

Premium Pricing. The other significant downside of buying packaged analytics is price, according to survey respondents. (See illustration 23.) Most packaged analytic applications (or modules) are priced starting at $300,000–$500,000 and quickly rise to several million dollars. The price varies by the number of users, developers, and data sources involved as well as whether a data warehouse/mart needs to be built from scratch.

"I don't see the ROI for packages just yet. They are expensive, the market for them is still immature, and we already generate the metrics and reports we need to run our business from our data warehouse," says Thomas Legere, enterprise architect for Pfizer Global Research and Development in Groton, Connecticut.

Vendors justify the premium pricing because of the time they save organizations in deploying, maintaining, and enhancing the application. Shaving an extra month off a custom development project can save hundreds of thousands of dollars in labor costs and consulting charges. It can also accelerate the bottom-line benefits that companies reap from actually analyzing data. Moreover, packages reduce a company's cost to maintain and enhance the application and support and train users.
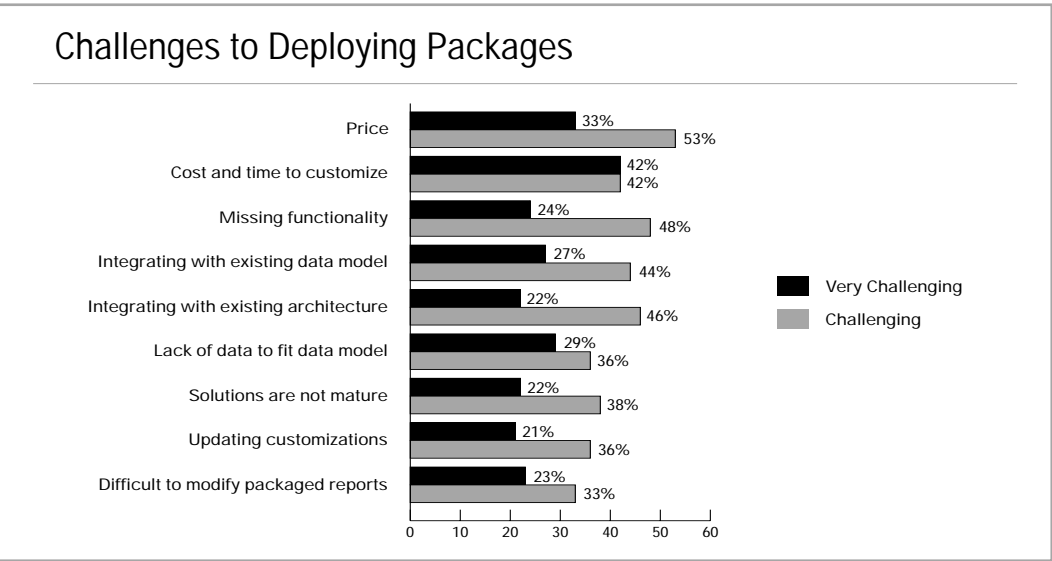

Illustration 23. Price as well as cost and time to customize lead the pack of challenges in implementing packaged applications.

Other Challenges. Although survey respondents checked many challenges in deploying packaged applications, overall most do not seem to pose severe challenges. The only challenges that more than a third of respondents said were "very challenging" were "cost and time to customize" and "price."

Build versus Buy: The Final Analysis

The decision to build or buy an analytic application is an important one. Potentially, millions of dollars ride on the decision. Yet, it appears that selecting the right approach is not as important as understanding the ingredients of a good analytic application and how to deliver one, regardless of the approach used.

Moot Decision. In some cases, the build or buy decision is moot. There simply may not be a package available in your target application area. In other cases, the package may only be tangentially related and thus missing functionality that you need to justify the investment. In these cases, you may spend as much time and money customizing the package as you would by building the application from scratch using in-house developers.

Packages May Not Exist In Your Area

Impact of the Data Warehouse. Whatever the case, the bulk of the effort required to either build or buy an analytic application is wrapped up in delivering a data warehouse or data mart—the basic infrastructure required to get the data right. If your data is wrong—inaccurate, non-integrat-

ed, or poorly modeled—everything else matters little. The best packages or analytic development platforms can't overcome a poorly designed data warehouse or an underpowered infrastructure.

Most Platforms And Packages Assist In Building A Data Warehouse

Fortunately, most analytic packages and analytic development platforms assist in creating data warehouses or data marts. The more complete packages and platforms provide tools to create both the data infrastructure and the analysis environment in an accelerated fashion.

Similarities

So, are there any significant differences in the outcomes of the build or buy approach? Will one deliver a better outcome than the other? Are there guidelines that can help you decide whether you should build or buy?

Outcomes. Overall, our survey suggests that you can get similar results whether you build or buy an analytic application. The percentage differences in the following charts are statistically insignificant, except in one category of responses.

Both packaged and custom analytic applications seem to have an equally good record for deploying on time and under budget. (See illustration 24.) Most are deployed and modified at the same rates. (See Illustrations 25 and 26.) And, most importantly, both approaches satisfactorily meet user information needs. (See illustration 27.)

Packaged Users Still In Planning Phase

A Lot of "Not Sure" Responses. However, the chart data shows one significant difference: there is a greater percentage of "buy" respondents who selected "not sure" to the questions posed in illustrations 24 to 27. Not coincidentally, the percentage difference in "unsure" responses between the two groups closely correlates to the percentage difference among the positive responses in the following charts.

This suggests that many organizations have yet to start or finish deploying packaged analytics and thus haven't yet measured the benefits. This makes sense given the relative infancy of the packaged analytics market.

Differences

Although the outcomes of building and buying an analytic application appear to correlate, there are differences between the approaches worth noting.

The "Build" Approach Adapts To Existing Data Models

Data Warehouse Silos. First, custom analytic applications, by nature, can adapt to whatever architecture, data model, or process model your organization already has in place. You simply build against what already exists. On the other hand, packaged analytics usually require companies to implement a new data warehouse or data mart based on the package's unique data model.

Companies that have already deployed a data warehouse with a custom data model are hard-pressed to justify the time and money needed to migrate the organization to a new data model with new definitions and rules for major entities and measures. Either they will try to change their existing data warehouse model to conform to the package or vice versa. Both options involve significant customization and cost.

"If we bought a package, it would have to leverage our existing data warehouse," says one data warehousing manager who responded to our survey.

Another alternative is to run the custom and packaged environments side by side, with each supporting related but different applications. But this creates an integration nightmare.
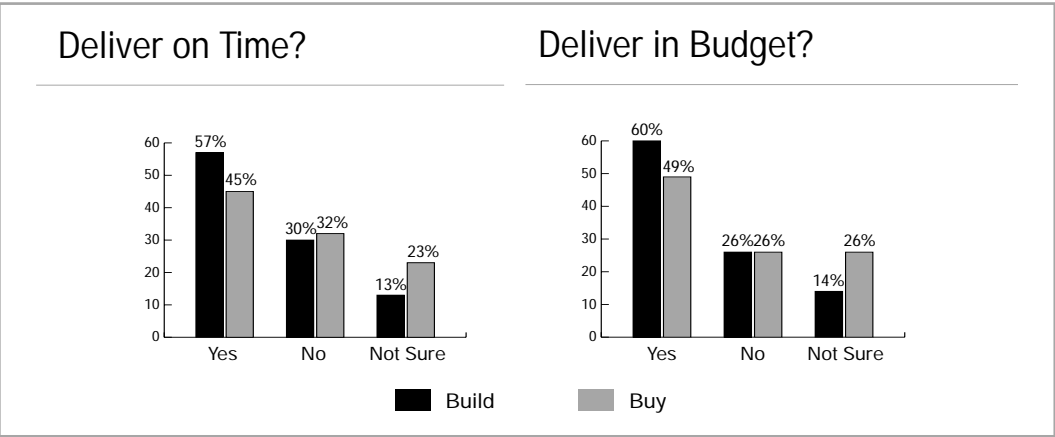

Illustration 24. *Custom and packaged analytic applications generally are delivered on time and within budget.*
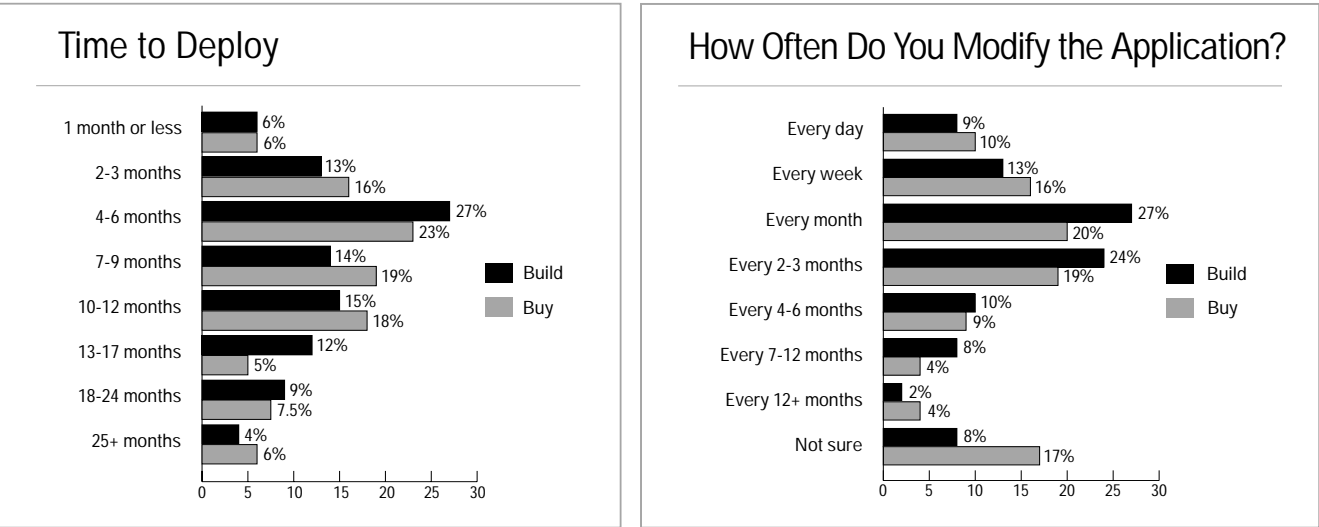

Illustration 25. *Both approaches provide comparable rates of deployment although averages calculated against the above data indicate that packages are quicker to deploy by almost a month.*

Illustration 26. *Organizations modify custom and packaged applications at the same rates.*
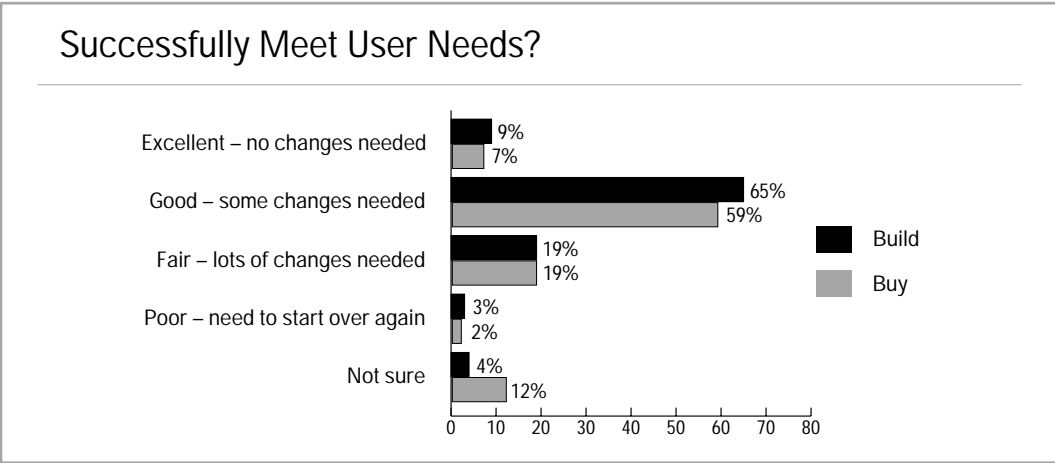

Illustration 27. *Both packaged and custom analytic applications generally meet end-user information requirements*

Without a unified data model, users will generate reports with inconsistent data and there will be no single version of the truth in the organization. Most IT architects would have difficulty sanctioning a decision to create "stovepipe" analytic systems.

Consequently, most organizations with existing data warehouses do not purchase analytic packages in the same domain. The exceptions are companies whose data warehouses or analytic tools are no longer meeting user needs and need to be replaced, or organizations that need to integrate two or more existing data warehouses in a politically acceptable way.

Costs. Another difference between the two approaches, according to the survey, is that purchasing a packaged analytic application is slightly more costly than building a custom analytic application.

Almost one-third (29 percent) of custom analytic applications were deployed for less than $100,000 compared to 20 percent of packaged analytic applications. In contrast, more than half (56 percent) of packaged applications were installed for between $100,000 and $1 million compared to 46 percent of custom applications. Both custom and packaged approaches registered the same number of responses for applications that cost more than $1 million to deploy. (See illustration 28.)
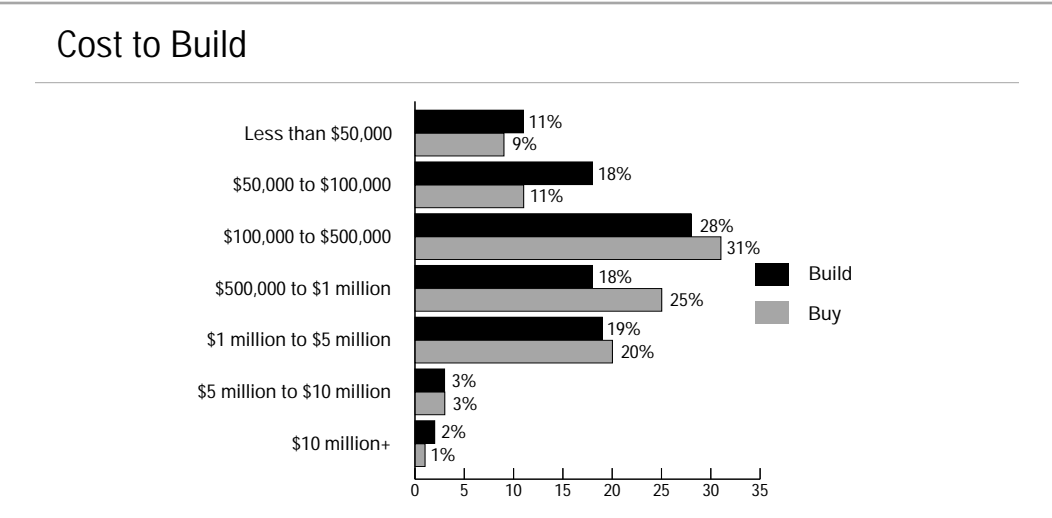

Illustration 28. There are more custom applications that cost less than $100,000 than packaged applications.

Packaged Analytics Are A New Market Compared To Custom Analytics

Maturity. A final difference between the two camps is that the "buy" market for packaged analytic applications is just heating up while the "build" market has been evolving for more than a decade. Simply put, packaged analytic applications have further to go to reach the same level of maturity as custom analytic applications.

Parallel Emerging Markets

However, as previously mentioned, the "build" market is being reshaped by the advent of analytic development platforms. These environments take the sting out of building robust, Web-based, custom analytic applications. Thus, we are observing two new business intelligence markets emerge in parallel—packaged analytic applications and analytic development platforms.

Users Need BOTH Packaged And Custom Analytics

The natural tendency is to compare and contrast these two markets to see which will dominate and subsume the other. The reality is that both will continue to grow and mature and provide solutions that better meet organizations' needs than today's current generation of analytic applications.

Buy And Build. In fact, packaged analytics and custom development platforms will soon converge because organizations need both. They want an application package that can be quickly deployed and a robust development environment in which to customize the packages. So, in the next few years, the issue will change from "build versus buy" to "buy and build." The next-generation analytics platform will embed the best of packaged analytics and the best of custom development platforms.

The Market Will Migrate To Build AND Buy

Deployment Guidelines

In the meantime, it is likely that you will need to make a "build" or "buy" decision when implementing your next analytic application. Based on our research, we can offer several guidelines.

Build If You Have…

- **An Applicable Data Warehouse.** You have a successful data warehouse whose data model already supports the target domain or can be easily extended to meet the new analytic requirements.

- **A Standard Architecture.** You don't want to introduce non-standard applications that use different terms, definitions, and rules (e.g., a different data model) than your existing related applications or run on platforms that your company doesn't support. In short, you want to avoid creating silos of analytic information that can't be easily integrated.

- **Available, Skilled IT Professionals.** You have a team of architects, data modelers, project managers, requirements specialists, tools specialists, and support personnel (e.g., testing, help desk, and trainers) with experience in building data warehouses and analytic applications who are available to work on the project.

- **Truly Unique Requirements.** Your company competes in a volatile business climate and is undergoing rapid change (e.g., mergers, acquisitions, and divestitures) due to deregulation, globalization, or other economic factors that create complex reporting requirements and systems integration challenges.

- **A Customizing Culture.** Your IT group may be predisposed to build rather than buy, or more likely, your business users demand a high degree of customization, even when package solutions are purchased. In these cases, the prudent thing to do is "build" despite corporate edits to "buy."

- **A Desire to Differentiate.** Your company believes that information is a critical corporate asset and can differentiate it from the competition. Your company invests heavily in business intelligence to obtain strategic advantage, bottom-line ROI, and "soft" benefits that come from giving employees better access to information.

- **No Packages Available.** You can't find a package that offers adequate functionality to support your target application and which conforms to your company's existing architecture (i.e., runs on the appropriate databases, hardware, and analytic tools).

Buy If You …

- **Plan to Deploy a Packaged Operational Application.** The value and ROI of a packaged analytic application increases significantly if your company plans to

deploy a packaged operational application. Even if you have an existing data warehouse and analytic applications, the ROI of simultaneously implementing operational and analytic packages may be worth swapping out analytic systems.

- **Don't Have a Data Warehouse.** If you are starting from scratch and your knowledge workers have limited access to information today, a packaged analytic application may be a good way to get your company up to par with the rest of the industry. The package will provide a baseline set of reports and analytics, and in some cases, advanced features that you could never justify building on your own.

- **Need to Replace Your Analytic Application.** If your data warehouse or current slate of analytic tools are not meeting user needs and you are ready for a wholesale change, consider an analytic package.

- **Need to Deploy Quickly.** Your company wants to deliver better reports and analysis quickly, and you don't have time or the political will to undertake an elaborate requirements gathering project.

- **Can Adopt Standard Business Processes and Rules.** Your company can accept the business processes, rules, and definitions supplied by the package and establish them as corporate standards. This adds greater consistency to your business processes and reduces the time required to customize a package, increasing its ROI.

- **Can Find a Suitable Package.** Your company has identified an analytic package that provides suitable functionality for the target application.

The above guidelines are a starting point to help you decide whether to build or buy an analytic application. Each organization will need to do its own analysis, factoring in its technical infrastructure and skills, organizational culture, requirements, and the strategic direction of the business.

Conclusion

Many people today associate analytic applications with analytic packages. Hopefully, this report has convinced you that you can either build or buy an analytic application. Both approaches have merits and can be used to deliver business value.

Moreover, the toolsets that support each approach are rapidly maturing. In the past two years, we have seen the emergence of both rapid application development tools for building analytic applications as well as domain-specific analytic packages for buying analytic solutions. As these products mature in functionality and robustness, they will also converge. This will allow you to obtain the best of both worlds and adopt a buy **and** build approach.

Whether you build and/or buy, the key is to execute your strategy and deliver a robust analytic application that delivers the information and analysis that business users need. Your analytic applications should be easy to use, scalable, extensible, and geared to the enterprise. It should also embody best practice metrics in specific domains, support a variety of decision-making processes, and run on a robust BI infrastructure that supports the entire BI lifecycle. If your analytic application can meet these requirements, your project will be a success. Good luck! ■

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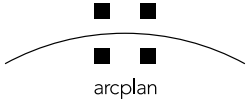
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