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Beyond the Basics: Accelerating BI Maturity

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TDWI Research provides research and advisory services advice for BI professionals worldwide. TDWI Research focuses exclusively on BI/DW issues and teams up with industry practitioners and TDWI faculty members to deliver both a broad and deep understanding of the business and technical issues surrounding the deployment of business intelligence and data warehousing solutions. TDWI Research delivers commentary, reports, and inquiry services via TDWI's worldwide Membership program and provides custom research, benchmarking, and strategic planning services to both user and vendor organizations.

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The Data Warehousing Institute (TDWI), a division of 1105 Media, Inc., provides in-depth, high-quality education, training, research, and certification for business intelligence (BI) and data warehousing professionals worldwide. TDWI can help your BI team stay abreast of new and emerging trends and techniques and gain the skills it needs to deliver effective BI and data warehouse solutions. Through our Membership program and regional chapters, TDWI can also help you and your team establish a network of peers in the industry to whom they can turn for assistance and advice to solve thorny technical and organizational problems and career development.

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Executive Summary

This paper introduces the TDWI Maturity Model, but focuses on the last two stages of development—the Adult and Sage stages. Although less than 20 percent of organizations claim to have entered these two stages according to TDWI Research, all BI practitioners will benefit from examining the characteristics of mature BI implementations. Knowing what's possible with BI gives organizations a goal to aim for and the motivation to overcome the challenges and pitfalls that plague every BI implementation.

Not until organizations move into BI adulthood are they ready to reap the full benefits of BI.

A Ticket to Play the Game. The early stages of BI involve readying the data infrastructure and project and development methodologies for full exploitation by the business. As companies move through the Infant, Child, and Teenager stages they increasingly consolidate analytical stores and standardize terms and rules for defining key dimensions, facts, and metrics. While these early-stage BI implementations deliver business value, it's not until organizations "cross the chasm" into adulthood that they are truly ready to play the game and reap the full benefits that BI can provide.

BI Metamorphosis. The Adult and Sage stages are marked by a rapid increase in use of the BI solution by end users, including customers and suppliers in highly mature implementations. This is largely because BI mutates from an insight-delivery system to a business monitoring system to an automated decision-making system. Thus, in its final stages, BI becomes a mission-critical system that drives core business processes, and in many cases, provides a competitive differentiator in the marketplace.

The focus of mature BI implementations is on metrics and performance.

Metrics Management. While the focus of early-stage BI is on reports and analysis of historical trends, the focus of mature BI implementations is on metrics and performance. Companies implement dashboards to monitor, manage, and optimize operational performance, and implement scorecards to monitor the execution of business strategy across all departments and levels of the company. These organizations use metrics to communicate strategy in a personalized way, align all groups with corporate strategy and objectives, and empower individuals to work proactively to meet goals.

Federated Management. Finally, to support these endeavors and respond quickly to new and changing business needs, the BI team migrates from a tightly controlled, centralized deployment and management model to a distributed, federated model that empowers departments and business units to deliver BI capabilities according to well-defined standards and best practices. These BI Centers of Excellence represent the culmination of a long journey from analytical silos to centralized IT management and back again to distributed development. The mantra of mature BI teams is "design global, implement local."

Organizations with mature BI deployments generate significant business value, often measured in terms of new revenues and customer wins. When BI becomes an integral part of achieving business strategy, managing business processes, and achieving revenue and profit goals, it fulfills its mandate and promise.

The Early Stages of BI

Business intelligence (BI) emerged as a new information management discipline in the early 1990s. Since then, most large companies have implemented a data warehousing environment of some kind and evolved it through several iterations to support more users, data, and functionality. They have also given business users reporting and analysis tools to gain access to the trends, patterns, and rules buried within the data warehousing environment.

Initial BI Projects. Companies that implement BI for the first time generally empower information specialists—mainly power users or business analysts—with tools that give them ad hoc access to information so they can gain a better understanding of historical business events and trends. The specialists then summarize and format their findings in custom reports and online "briefing books" for executives and managers who want data to validate or guide their decisions and planning efforts.

First-time BI projects often shipwreck on the twin shoals of an ambitious project scope and poor data quality.

THE GULF. These early-stage BI projects inevitably run into a series of challenges and obstacles that TDWI calls "The Gulf." (See Figure 1.) First-time BI projects often shipwreck on the twin shoals of an overambitious project scope and poor data quality that frequently cause these projects to run behind schedule and over budget. And when these organizations finally deliver their BI solution, business users are often less than thrilled with the results: the new system doesn't answer their business questions or present information the way they anticipated.

The divergence between expectation and reality usually occurs when BI teams try to apply classic software development techniques to the imprecise and fast-moving world of BI. The problem is that most business users have difficulty defining exactly what information they need until they see it. This moving target makes it nearly impossible for BI developers to succeed with traditional waterfall development techniques. In addition, user requirements change rapidly because the business changes and users have new questions they want a BI tool to answer that they didn't anticipate when the project kicked off. Thus, a BI project that takes six to nine months to deliver—common for early-stage BI projects—may answer the wrong questions and address the wrong problems.

Spreadmarts provide conflicting views of information and performance that undermine decision making.

Spreadmarts. Consequently, many business users will retreat to their "pre-BI" systems, typically spreadsheets or Access databases to collect, analyze, and report on business data. (Or they'll hire a business analyst to do this for them.) TDWI calls these data shadow systems "spreadmarts" because they're usually built with spreadsheets, and when left unchecked, spread throughout an organization, wreaking havoc wherever they go. Spreadmarts provide conflicting views of information and performance that undermine decision making, prevent strategic alignment, and turn high-paid business analysts into glorified data administrators.
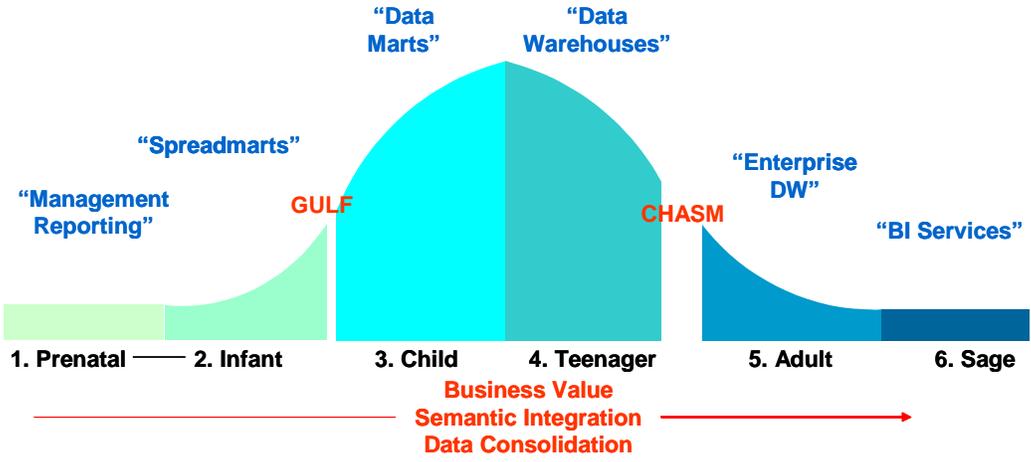
Figure 1. The TDWI Maturity Model depicts how organizations evolve their BI deployments. The Gulf and Chasm represent major sets of challenges that afflict BI projects and cause them to founder; the bell-shaped curve represents the number of enterprises in each stage; the labels above the bell curve represent the types of data structures commonly found in each stage.

BI Adolescence. Nonetheless, many organizations overcome these challenges and build successful BI solutions, most of which are departmental in scope. These organizations learn the importance of building a data warehouse one subject area at a time rather than all at once, to minimize scope creep and data quality issues. Business analysts and power users start to forego their spreadmarts in favor of ad hoc reporting and online analytical processing (OLAP) tools that provide a multidimensional view of the business across multiple subject areas and are easy to navigate and use.

The departmental approach, however, suffers from the same problems as the spreadmart approach, but on a different scale. When each department creates its own data warehouse, the result is a kaleidoscope of repositories that do not use consistent definitions or rules for common data elements, such as customer, sale, profit, order, and so on. To compound the problem, departments usually purchase different reporting and analysis tools and apply unique rules within the reports. These "independent data marts" create a problem whenever the chief executive asks for a unified view of past performance across all departments and cannot get it. The redundancy in supporting multiple, nonintegrated BI systems also becomes a major problem for cost-conscious executives.

Organizations find it difficult to cross the chasm because of business volatility, politics, and change management issues.

THE CHASM. To remedy this problem and achieve a consistent view of shared business information, many executives initiate an enterprise data warehouse (EDW) project. These executives are fed up by departmental data silos that generate reports with conflicting views of business performance. Their goal is to consolidate renegade data marts and data warehouses and deliver a more consistent set of corporate information and reports across all facets of the business.

Business Volatility. But delivering an EDW and achieving a single version of the truth isn't easy. For one, organizations in fast-moving industries change quickly, making it difficult to deliver a common set of business semantics (i.e., rules and

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definitions.) But even in slow-moving industries, a new CEO, new regulations, a change in strategy, or new economic conditions can make it difficult for an organization to spend the time and money needed to consolidate dozens if not hundreds of data warehousing and reporting systems into a unified whole.

Politics. And then there are politics. Getting different departments and business units to abandon their customized solution, let alone agree to use standard terms, definitions, and rules or adopt a corporate standard for BI reporting and analysis tools, is never easy.

Change Management. Moreover, habits die hard. Users who rely on a colleague or an IT department to create custom reports on demand often resist when told they need to generate their own reports. Conversely, some users take the concept of self-service BI to the extreme, creating thousands of reports—most of which vary by a few columns—that clog libraries, degrade performance, and make it difficult for users to find what they are looking for. And then there are users who refuse to automate, preferring to rely on gut instincts or outmoded tools to make decisions.

Late-Stage BI

Crossing the Chasm. Organizations that leap across the chasm between BI adolescence and BI adulthood reap rich rewards. They create EDW environments that offer a consistent view of information across departments. They deliver more user-friendly, interactive reports via dashboards, scorecards, and parameterized reports that make BI more accessible to a majority of users in the organization. They also begin to augment the historical data in their data warehousing environment with time-sensitive or real-time data—data that is delivered to users within hours or minutes of an event or transaction—so users can work proactively to solve problems and capitalize on opportunities.
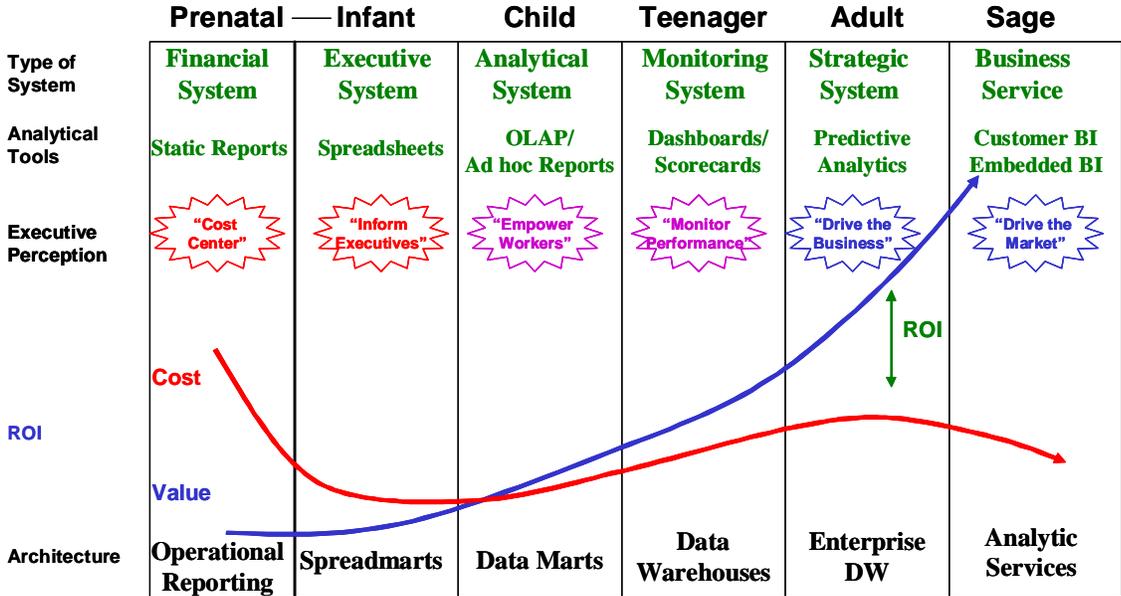
Moreover, the business value of their endeavors grows exponentially as more data and users are supported by the new enterprise environment. The purpose of the BI solution is no longer only to gain understanding and awareness, but to deliver actionable information that can spell the difference between business success and failure. Here, BI becomes a mission-critical system designed to optimize processes and performance on a day-to-day basis, and in some cases, on a minute-by-minute basis. These BI systems run the business, and in some cases, drive the market by providing a competitive advantage. (See figure 2.)

Pervasive BI. Late-stage BI programs break through the barrier that limits BI use to a small percentage of business users. According to TDWI Research, only 19 percent of all potential BI users are using reporting and analysis tools on a regular basis.[1] By using BI to monitor and manage core processes, including those that extend beyond

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[1] From Eckerson and Howson, *Enterprise BI: Strategies and Technologies for Deploying BI on an Enterprise Scale,* TDWI Research, 2005.

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organizational boundaries to encompass customers and suppliers, mature BI deployments succeed in making BI a pervasive resource.

	Prenatal —— Infant	Child	Teenager	Adult	Sage
Type of System	Financial System	Executive System	Analytical System	Monitoring System	Strategic System	Business Service
Analytical Tools	Static Reports	Spreadsheets	OLAP/ Ad hoc Reports	Dashboards/ Scorecards	Predictive Analytics	Customer BI Embedded BI
Executive Perception	"Cost Center"	"Inform Executives"	"Empower Workers"	"Monitor Performance"	"Drive the Business"	"Drive the Market"
Architecture	Operational Reporting	Spreadmarts	Data Marts	Data Warehouses	Enterprise DW	Analytic Services

(Chart overlay labels: Cost, ROI, Value, ROI)

Figure 2. The ROI of BI solutions increases dramatically in the Adult and Sage stages as organizations use BI to drive business strategy and processes.

According to the BI Maturity Model, once organizations reach maturity, there are two stages of development: Adult and Sage. While many organizations exhibit characteristics from both stages without evolving distinctly from one to the next, it is helpful to examine each stage as an independent phase of development.
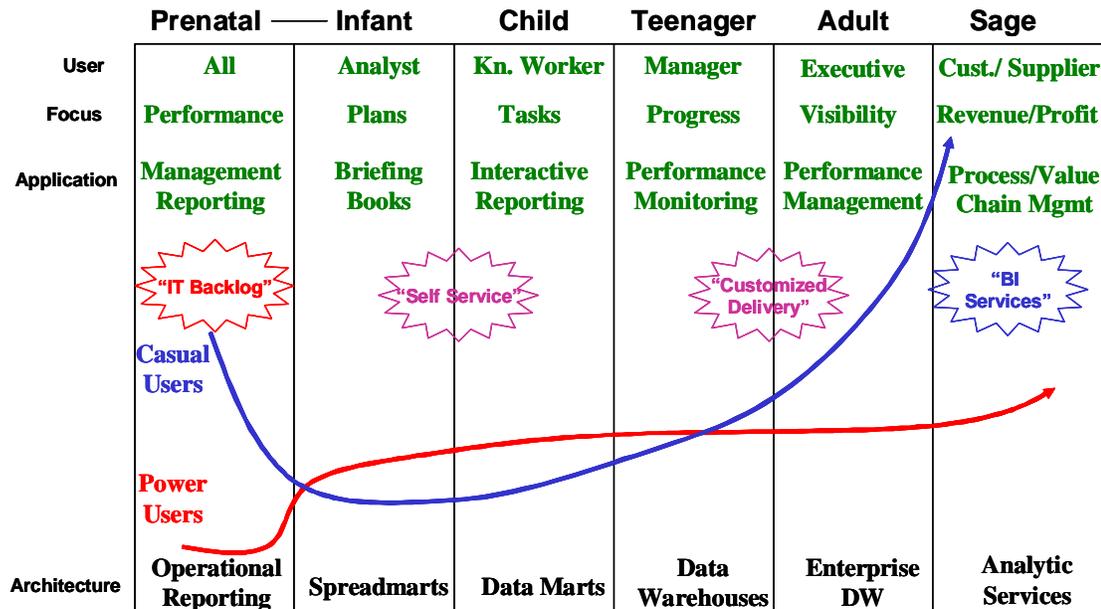
The Adult Stage

Organizations in the Adult stage exhibit three major characteristics that enable them to transform BI from a tactical resource into a strategic one where BI becomes pervasive and begins driving business operations. (See Figure 3.) In the Adult phase, organizations use BI to monitor and manage core business processes and take proactive steps to achieve goals and targets. Here, BI becomes a mission-critical system that drives the business on a daily basis.

1. **CENTRALIZED MANAGEMENT.** Organizations that have gone through the effort and pain of consolidating multiple analytical silos usually want to retain tight control over the management of the BI environment. Thus, the first major characteristic of Adult stage companies is that they centralize the management of the BI resource and make it available as a shared services to all departments. These companies typically create a separate BI/DW group that is independent of any department and reports into the COO or CIO, who in turn reports directly to the CEO.

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BI becomes an enterprisewide service, not bound to a single department.

In some cases, organizations pull the BI/DW group out of the IT department, leaving IT to manage the data center, desktops, and network infrastructure. Often, these so-called information management (IM) groups oversee other information-centric technologies, including predictive analytics, content management, portals, application development, data integration, and master data management. In other cases, companies establish an independent BI/DW group within corporate IT that supports the entire enterprise, not a single department.

	Prenatal —— Infant		Child	Teenager	Adult	Sage
User	All	Analyst	Kn. Worker	Manager	Executive	Cust./ Supplier
Focus	Performance	Plans	Tasks	Progress	Visibility	Revenue/Profit
Application	Management Reporting	Briefing Books	Interactive Reporting	Performance Monitoring	Performance Management	Process/Value Chain Mgmt
	"IT Backlog"	"Self Service"		"Customized Delivery"		"BI Services"
	Casual Users					
	Power Users					
Architecture	Operational Reporting	Spreadmarts	Data Marts	Data Warehouses	Enterprise DW	Analytic Services

Figure 3. The number of casual users (i.e., executives, managers, operations workers, customers, and suppliers) accelerates in the Adult and Sage stage as organizations use BI to monitor core processes, calibrate and track performance, and use BI to cement relationships with customers and suppliers.

2. **FLEXIBLE DATA ARCHITECTURE.** Another characteristic of BI solutions in the Adult stage is that they are built on top of an agile BI architecture that adapts to new and changing business requirements.

Many elements go into creating an agile architecture. One common technique is to load transaction data into a persistent staging area before transforming and loading data into the EDW. Data designers can then repurpose this reservoir of data at a later date to meet new and changing business needs without having to go back to source systems again. Another important technique is to create a flexible data model using layers of abstraction so designers don't need to write the model each time the company reorganizes territories and reporting structures, adds or changes products, or revises business rules or reports. Architects also use abstraction to insulate different parts of the architecture from changes in upstream or downstream systems. Both ETL and BI tools offer semantic layers that create this insulating buffer.

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Mature BI teams use several methods to anticipate business requirements.

It is also critical for designers to anticipate business requests and to build into designs requirements they expect to be implemented in the future. Successful BI teams do this by spending several weeks at the outset of a project interviewing executives higher up the hierarchy and in adjacent departments to create a global logical model of the business. By looking "above" and "across," BI teams can better understand the business strategy and objectives driving the BI solution and align with existing or planned projects in other departments. However, the best way to anticipate requirements comes from BI team members who have many years of experience in their company and industry and have an intuitive grasp of the business.

3. **BUSINESS-DRIVEN APPLICATIONS.** The final characteristic of Adult stage companies is that they use BI to support mission-critical business applications.

Operational BI. By capturing data in near real time, these organizations open a whole new set of applications to BI technology that are more operational in nature. (See figure 4.) From monitoring truck shipments and flight arrivals and departures to optimizing sales in call centers and Web sites, these operational BI applications support the core processes that drive the business. If the BI application falters, the operations and processes grind to a halt or experience significant slowdowns, and the company loses time and money. Unlike their predecessors, BI systems that support business operations must be industrial-strength, providing backup, recovery, and failover capabilities to ensure high levels of availability and performance.
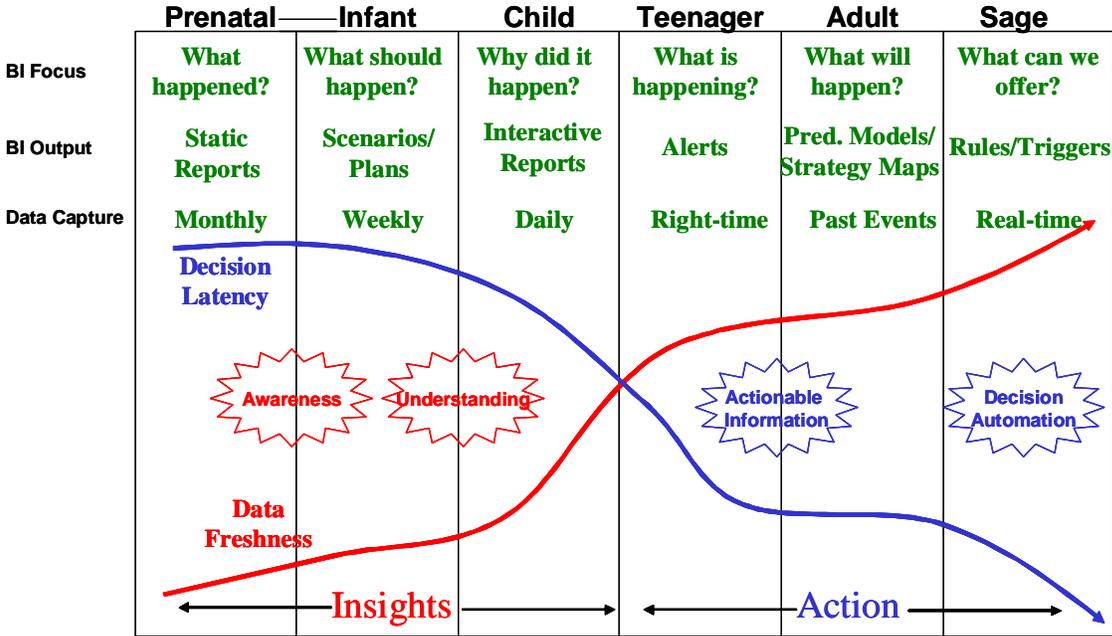
Figure 4. Starting in the Teenager phase, BI starts delivering actionable information using dashboards, predictive models, strategy maps, and just-in-time information, culminating in the automation of decisions in some Sage stage applications.

Performance Management. Besides monitoring performance with just-in-time data, Adult stage companies optimize performance using metrics-based management. Here, companies define metrics and goals aligned to the strategic objectives of the organization that cascade down to all levels of the organization. Usually deployed as dashboards or scorecards, these business-driven applications are powerful agents of organizational change. They focus employees on the most value-added activities and keep the entire organization aligned and driving towards a common goal.

Predictive Models. Finally, Adult stage organizations use statistical and machine-learning technology to predict future events and customer behavior. For example, marketing teams create predictive models to forecast customer demand, churn, and propensity to respond to offers, and then build marketing campaigns to take advantage of this knowledge. Manufacturing companies use predictive models to anticipate machine obsolescence on the factory floor; clinical researchers at hospitals use predictive models to better classify diseases and methods for treating them; and universities use models to predict which college applicants will choose to enroll and which will not. The business uses of predictive modeling are limitless.

The Sage Stage

BI as a Utility. In the final stage of evolution, BI becomes a service that is fully embedded within core processes, applications, and go-to-market strategies of an organization. Here, BI becomes a utility that various parts of an organization can tap into to solve business problems and capitalize on market opportunities. As a utility and embedded service, BI transforms itself from a monolithic IT system and program to an agile, flexible service that adapts quickly to new and changing business conditions.

At this stage of the BI Maturity Model, organizations reshape BI in four major ways. They: 1) redistribute development back to departments and lines of business, 2) leverage Web and middleware services to create composite, blended applications, 3) embed predictive models into operational applications to automate decisions, and 4) apply BI capabilities to deliver new, value-added services to customers and suppliers. Let's look at each of these developments in detail.

Organizations need to delegate and distribute responsibility for BI system and application development to business units and departments.

1. **FEDERATED DEVELOPMENT.** In the Adult stage, organizations begin to recognize that a single, monolithic architecture—as elegant as it may be designed—sacrifices agility and adaptability for control, quality, and standardization. To move forward, organizations need to delegate and distribute responsibility for BI system and application development to business units and departments. For BI teams that have spent years struggling to create a unified, centralized BI environment, the notion of federating development and administration seems counterintuitive, if not downright suicidal!

But the alternative is unpalatable: if business users become frustrated with the BI environment because it is too slow and unresponsive to their needs, they will take matters into their own hands and circumvent the system. Ambitious business users will create analytic shadow systems to get the information they need when

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they need it, reverting the organization to the Infant stage of maturity. So, either the BI team redistributes development on their terms or the business users will do it for them. Obviously, this is difficult to do, and takes courage, trust, and foresight.

To succeed in redistributing development, BI directors need to establish standards and best practices for developing and administering BI applications to which departments and business units can adhere. The standards align the disparate development efforts so the end result is a unified architecture in which data flows seamlessly and reports and tools work interchangeably across the independently designed and managed environments. Common standards to support BI federation include:

- File-naming conventions

- Conformed dimensions, facts, and metrics

- Modeling standards for handling slowly changing dimensions and the use of primary and surrogate keys, super- and sub-types, and lookup tables

- Metadata definitions and repository standards

- Error logging and exception handling processes

- Tools for performing extract, transform, and load (ETL) and application development

- Project and program management processes and procedures.

Best practice: centralize before you federate.

BI Centers of Excellence. Many organizations establish Centers of Excellence to promulgate these standards and provide development, technology, or project management expertise if required by the satellite groups. Interestingly, organizations that try to federate development and administration before they have centralized these tasks often have limited success. Federation usually doesn't work until companies have developed a large body of experience from which to draw best practices and standards for managing BI projects and developing BI applications tailored to each organization. The beauty of federation is that it captures and documents the knowledge of veteran BI managers and developers so the organization creates a "living repository" of best practices and techniques. When it disseminates this knowledge to other groups in the organization, it significantly expands its team and ability to meet business needs quickly at a local level without jeopardizing enterprise standards and the single version of truth.

2. **BLENDED APPLICATIONS.** Sage stage organizations also begin to break down the barriers between analytical and operational systems, and to develop blended applications. Rather than force business users to use one application to execute and manage a business operation and another to analyze the results, enlightened BI directors recognize that they best serve the organization when reports, analyses, and monitoring capabilities are embedded within core business processes and applications that run the company on a daily basis.

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Blended applications close the loop between analytical and operational processes.

These blended, or composite applications "close the loop" between analysis and action and enable users to manage both tasks—executing a business operation and analyzing results—without changing application contexts. For example, many marketing managers use BI tools to analyze campaign results, segment customers, and pull lists for new campaigns. However, to set up and execute the campaign, they need to switch from the BI application to the campaign management module in their customer relationship management (CRM) package. With a blended application, marketing managers can perform all the tasks needed to analyze and execute a campaign within a single application that connects dynamically behind the scenes to both BI and CRM services run on different servers as well as external services.
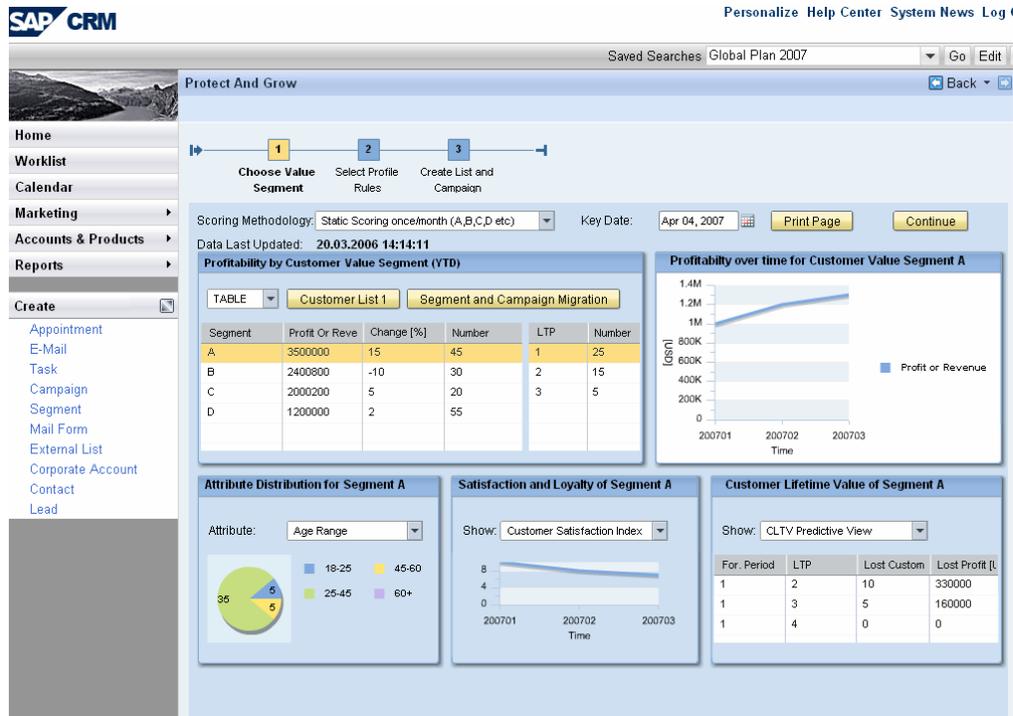
Figure 5. This diagram shows a composite application that enables a marketing manager to analyze results and execute a marketing campaign within a single, blended application.

There are three ways to create a blended application. One is to embed proprietary application programming interfaces (APIs) from a BI tool into an operational application that calls a BI server to execute BI functions, such as displaying a chart within a portal. Often these APIs don't support the full range of functionality offered by the commercial BI product. Another option is to embed open source BI code into the operational application. While open source BI products are improving, this option requires the organization to edit, update, and maintain source code within the operational application, which can be costly over time.

The most progressive way to create blended applications is to tap into existing applications and services using standard middleware, such as Web Services or a development environment from a large software companies. For example, SAP

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offers the NetWeaver platform, which exposes business functionality found in SAP and partner applications, and technical capabilities, such as BI, portals, and collaboration, as ready-to-use enterprise services and process components. Using NetWeaver development environments, developers can weave these services together into composite applications that provide complete support for multifaceted and cross-departmental business processes.

3. **DECISION AUTOMATION.** Sage stage companies also try to automate well-known processes using predictive models and rules engines. In fact, sophisticated composite applications often incorporate rules and models to automate various steps in a process flow.

For example, in 2001, the regulatory arm of NASD (which at that time ran the NASDAQ stock exchange) established a workflow program called Insite, which managed a rigorous process to measure, monitor, and examine a wide range of broker-dealer activities based on 250 metrics. Using predictive models, Insite identified broker-dealer firms that examiners should target and automatically generated the appropriate exam content and processes that examiners should use to have the best chance of identifying fraudulent or other behavior that represented heightened regulatory risk for investors and NASD. Thus, NASD integrated predictive models into the heart of a key regulatory and audit process designed to ensure the integrity of the exchange and its trading partners.

Online applications often combine simple Boolean rules with predictive scores to automate actions.

Today, companies have gone a step further and embedded predictive models into online applications that evaluate, or "score" events as they occur. Credit card companies score every transaction, looking for fraudulent activity; banks calculate customer credit and risk for certain types of online loans; and e-commerce sites apply predictive models to visitor transactions and browsing behavior to personalize shopping experiences and cross-sell products. In these cases, the underlying online applications often combine simple Boolean rules with predictive scores to automate actions that benefit the business.

4. **COMMERCIALIZED SERVICES.** The final characteristic of a Sage stage company is that it inverts its BI environment and makes it accessible to the outside world. Here, BI becomes part of the sales process. In most cases, tailored interactive reports become an additional service that increases the value of an existing product, service, or relationship, thereby increasing customer loyalty. But in some cases, the reports generated by the BI environment become a product itself for which companies charge. Additionally, some companies offer data warehousing services to other companies that don't have the time, money, or staff to build their own data warehousing environment.

The reports generated by the BI environment become a product itself for which companies charge.

For example, retailers are increasingly relying on BI services to optimize supply chain processes. They make available to their extended supply chain internal data about product sales and inventory, so suppliers can better track what products are selling and which are not. They can then quickly shift manufacturing, shipping, and logistics resources to meet demand. More than a decade ago, retail giant Wal-Mart seized a competitive advantage by giving suppliers access to store sales and product inventory information and then made them responsible for replenishing stocks on demand.

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While Wal-Mart uses information to make its supply chain hyper-efficient and squeeze costs out of the process, CCC Information Services sells the information generated by its BI environment. CCC provides information-centric services to the automotive claims and collision repair industries via its data warehouse and BI tools. These BI services, among other technologies, has helped CCC grow from a company that helped "a handful of insurers value totaled vehicles" to one that provides software solutions, analytical tools, and comprehensive data "to help its customers make better business decisions."

In both cases, companies use the BI environment as an agent to change the dynamics of competing in the marketplace, marking the transformation of BI from a cost center tool to a multi-organizational competitive weapon.

Conclusion

Get Your Data House in Order. Business intelligence has the potential to deliver significant value to organizations. However, the bulk of business benefits don't accrue until organizations achieve significant maturity with the BI technology and processes. The breakthrough occurs after an organization delivers a unified architecture with common semantics and consolidated data. After it gets its "data house in order," an organization has a ticket to "play" the BI game to its fullest extent. It is ready to use BI as a vehicle to drive the business and reshape the competitive landscape.

Adult Stage. In the advanced stages of BI, organizations collect data in near real time, which opens the door for BI to support operational, run-the-business processes. Here, workers can monitor business processes in real time, receive alerts when performance exceeds predefined thresholds, and work proactively to correct problems. In addition, organizations begin to move beyond monitoring processes to optimizing them through metrics management, using dashboards and scorecards to chart progress toward achieving strategic objectives at every level of the organization.

Sage Stage. The most advanced organizations blend operational and analytical processes by creating blended applications using service-oriented architectures (SOAs). These composite applications embed BI functionality within core applications so users can execute an end-to-end process without switching software contexts. These organizations also take the next step and commercialize BI services to connect more tightly with customers and suppliers. These commercial BI services exploit information for competitive advantage, transforming BI from a cost center tool to a mission-critical operation and revenue stream.

APPENDIX: SPONSOR PERSPECTIVE

Advancing BI Maturity with SAP NetWeaver

The deployment of an effective business intelligence (BI) architecture is not a simple task, nor can the move toward an information-driven company happen overnight. In addition, BI deployment is not a pure technology exercise that can be fully controlled by the IT department. However, with the right combination of technology, vision, and organizational commitment, organizations can accelerate their evolution toward a mature BI infrastructure that meets today's pressing business requirements and is agile enough to adapt to new and changing business needs.

SAP NetWeaver is an industry-leading, integrated platform trusted by organizations worldwide to manage mission-critical information needs. Deployed at 13,000 sites worldwide, SAP NetWeaver provides a complete technology infrastructure that embeds best practices for managing business processes and operations.

Following are seven best practices of leading SAP BI customers that have successfully moved into TDWI's Adult Stage and are headed towards its Sage Stage of BI maturity:

1. Establish a "corporate memory." Establishing a "corporate memory" as a core part of an enterprise data warehouse (EDW) greatly alleviates the challenges associated with changing business requirements. The challenge with purely purpose-driven BI deployments is that specific reporting requirements drive the definition of dedicated data models (InfoCubes) and extractors (extract, form, and load, or ETL). Although this enables IT departments to meet initial business requirements, the architecture becomes too rigid to meet business requirements as they change or evolve. A corporate memory in the form of a data integration layer, providing an information history separate from the transactional systems, helps resolve that challenge. This way, it is no longer required to revisit the entire data integration process (from ETL over data mapping) to satisfy emerging requirements, resulting in improved agility and speed of delivery. And because features and tools geared at data lifecycle management today make it possible to cost-effectively scale up in the tens or even hundreds of terabytes of data with SAP NetWeaver, data volume is no longer a hard constraint.

2. Provision clean, trustworthy master data. Master data management (MDM) has quickly become a popular way to establish a "single version of truth" among operational systems. MDM provides the consistent, single view of key dimensions such as customer, product, or employee. Use of dedicated MDM technology accelerates time to value, and shifts IT work to higher value-added tasks. This is the main reason why, increasingly, organizations are integrating SAP NetWeaver BI implementations with parallel executed implementations of SAP NetWeaver MDM. The "master data hub" provides the anchor for the information management architecture: common master data are provided by the MDM system, and transactional data (such as sales history) and key performance indicators (KPIs) are sources federated from the enterprise data warehouse, and complemented with real-time information directly form transactional operational systems.

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3. Move toward in-memory management. Performance-tuning measures, when taken to the extreme, can choke any well-intended BI initiative. Data warehouses built on relational databases traditionally require indexes and materialized views (or aggregates) to be built and rebuilt. This increases administration overhead and cost, load times, query-response times if no appropriate aggregate exists, and a loss of flexibility within the BI architecture. The move toward in-memory technology with SAP NetWeaver BI Accelerator dramatically increases the performance and agility of any SAP NetWeaver BI infrastructure by eliminating the need to apply conventional performance tuning.

4. Migrate from departmental to enterprisewide deployment. BI deployments need to grow from departmental to enterprisewide systems because most business activities and processes span multiple departments. For example, a marketing campaign (Marketing department) needs to consider past customer sales history (Sales department) and possible revenue impacts (Accounting department). SAP NetWeaver provides the information backbone for enterprisewide BI deployments, integrating SAP and non-SAP data alike, across multiple departments.

5. Move from data-focused to process-focused deployment. Many enterprisewide BI deployments are "data-centric" deployments, focusing on available data rather than on business value. Business value is created within business processes, such as sales, procurement, financial, or human resources administration. The BI deployments of leading SAP NetWeaver customers are moving from "data-centric" to "process-centric" endeavors. New requirements are defined and prioritized within "process councils," and include process experts as well as data and infrastructural experts. Instead of asking business users "what data do you need?" process-centric BI teams ask them "what are you trying to accomplish?" and "what is the business process(es) you are trying to support or optimize?"

6. Implement a BI service orientation. Exposing information via Web Services can substantially aid in facilitating the flexible use and reuse of that information, across various end user−facing technologies (including Web, search, mobile, and Web 2.0 widgets). SAP NetWeaver is a service-oriented platform, and can serve as the foundation for an enterprise service-oriented architecture (SOA). SAP NetWeaver exposes business functionality found in SAP and partner applications as enterprise services and process components, as well as technical capabilities, such as BI, portals, process management, and collaboration.

7. Implement composite analytic applications. Using the SAP NetWeaver development environments, developers weave the enterprise services we've discussed into composite applications that provide complete support for multifaceted and cross-departmental business processes. Organizations build SAP NetWeaver composite analytic applications from scratch using the SAP Visual Composer modeling tools, or buy them off-the-shelf preconfigured for industry-specific use, from SAP and selected partners.

In summary, SAP customers worldwide have implemented the best practices and design principles discussed here to help them accelerate their BI maturity and maximize business benefits and IT agility.

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