Overcoming the Business/Technology Disconnect with BTM

THE ALIGNMENT EFFECT

How to Get Real Business Value Out of Technology

FAISAL HOQUE

Advance Acclaim for *The Alignment Effect*

"The companies that will get ahead and stay ahead in today's interconnected business environment will be those that take control of technology, not those that let technology take control of them. Business leaders who want grab the reins and steer IT in the same direction as the rest of the business must read this book."

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– ***Chuck Martin***, *Author, Managing for the Short Term*

"It occasionally happens that the producer of an innovative technology reaps rewards even if the customer fails to realize the promised benefit. It never happens that the customer reaps rewards under such circumstances. If you want to avoid being that customer, get to know BTM as defined in *The Alignment Effect*."
– ***Isaac Applbaum***, *Partner, Lightspeed Venture Partners*

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FINANCIAL TIMES
Prentice Hall

Prentice Hall PTR
Upper Saddle River, NJ 07458
www.ft-ph.com

Library of Congress Cataloging-in-Publication Data

Hoque, Faisal
The alignment effect : how to get real business value out of technology / by Faisal (i.e., Faisal] Hoque.
p. cm.
Includes bibliographical references and index.
ISBN 0-13-044939-3 (alk. paper)
1. Information technology--Management. 2. Economic value added. I Title.

HD30.2 .H664 2002
004'.068--dc21

2002027866

Production Supervisor: Wil Mara
Acquisitions Editor: Jim Boyd
Editorial Assistant: Allyson Kloss
Marketing Manager: Bryan Gambrel
Manufacturing Manager: Alexis Heydt-Long
Buyer: Maura Zaldivar

The jacket, interior pages, figures, and tables were designed by Lance Sperring
The author photo on the jacket was taken by Peter Baker Studios

Published by Financial Times Prentice Hall
An imprint of Pearson Education, Inc.

The publisher offers discounts on this book when ordered in bulk quantities. For more information contact: Corporate Sales Department, Prentice Hall PTR, One Lake Street, Upper Saddle River, NJ 07458. Phone: 800-382-3419; FAX: 201-236-7141; E-mail: corpsales@prenhall.com.

Printed in the United States of America

This product is printed digitally on demand.

ISBN 0-13-044939-3

Pearson Education LTD.
Pearson Education Australia PTY, Limited
Pearson Education Singapore, Pte. Ltd
Pearson Education North Asia Ltd
Pearson Education Canada, Ltd.
Pearson Educación de Mexico, S.A. de C.V.
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Pearson Education, Upper Saddle River, New Jersey

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Dedication

Tom, this one is for you. For your unyielding faith, your sincere support, your continuous inspiration, and most importantly for your true friendship.

In memory of Faez.
– Faisal

In memory of Dennis.
– Ryan

Contents

Acknowledgments

THIS BOOK COULD NOT HAVE BEEN WRITTEN without the special talents and determination of Ryan J. Sheehan, Christine Aruza, Zoe Sochor, and Lance Sperring. A heartfelt thanks goes out to them for their patience and perseverance in seeing this project through to the end. I am also especially grateful to my entire company, enamics, Inc., for never losing its resolve in the quest to help others recognize and achieve the benefits of Business Technology Management (BTM). Through their tireless efforts my vision for BTM has been realized.

I will be forever indebted to the following for their personal support and for sharing their industry insights: Randolph C. Blazer, Chairman & CEO, KPMG Consulting, Inc.; Patrick F. Flynn, vice president and CIO, PACCAR, Inc.; Scott Hayward, managing director, JPMorgan Chase and Company; Dale Kutnick,

chairman, CEO & research director, META Group, Inc.; Dr. Jerry Luftman, best-selling author of *Competing in the Information Age* and Distinguished Service Professor, Stevens Institute of Technology; Chuck Martin, best-selling author of *Managing for the Short Term* and *Net Future* and former associate publisher, *InformationWeek*; Jack Mollen, senior vice president, Human Resources, EMC Corporation; Honorio J. Padron, president and CEO, Business Services, Exelon Corporation; Don Peppers, best-selling author of the *One to One* book series and founding partner of Peppers and Rogers Group; Chris Perretta, CIO, GE Capital Card Services, Kevin Poulter, head of Business Integration, British American Tobacco; John Sievers, president, Consumer and Small Business Group, Southern New England Telecommunications; Howard Smith, CTO, CSC Europe; Tom Trainer, former CIO, Citigroup, Inc., Eli Lilly & Co., and Reebok International Ltd.; and Carl Wilson, executive vice president and CIO, Marriott International, Inc. The candor with which they recount their experiences provides us all with a rich set of didactic cautions, lessons, and guidance. I hold each of these individuals in the highest regard.

I am also grateful to my editor, Jim Boyd, for the direction and continual support that he gave me throughout the entire process. No matter what unconventional request I made or zany idea I proposed to him, he always listened with a receptive ear and responded with patient suggestions that considered any alternative possibilities. Without his guidance and the efforts of the folks at Financial Times Prentice Hall, this book would never have made it from brainchild to bookstore.

Special thanks go to Frank Ovaitt and Paul Berg for the innumerable hours they have spent in support of this project. Time and time again, they kept me headed on the right path with their reliable and experienced counsel. They always have my deepest respect and I consider myself a fortunate recipient of their sage advice.

I also wish to extend my gratitude to the members of enamics' board of directors and advisory board in addition to the numerous customers, partners, and investors that have helped shape our thinking and validate our direction. It is through their feedback,

contributions, and encouragement that BTM has been able to successfully forge ahead in the marketplace.

Dale Kutnick and Meta Group also deserve special recognition for their commitment and support. From day one, they have demonstrated their belief in these concepts. The same also holds true for Sathish Reddy and the hard work of his team at Itreya. We wouldn't be able to pursue our vision without their dedicated labors, nor without those of Paul Daversa and his company, Resource Systems Group.

I am deeply grateful for having been blessed with a wonderful family and a few special friends. To my family, thank you for instilling in me, from the earliest days, the passion required for taking on a project of this magnitude and the drive needed to succeed. To my friends, thank you for touching my life and cheering me on.

Most importantly, I am eternally thankful for my wife and best friend, Christine Hoque, whose faith has inspired me to never give up all these years. She has encouraged all of my radical ideas and has endured with me the ups and downs, the 4 a.m. conversations, the lost evenings, and the delayed plans, that often come hand-in-hand when you decide to chase your dreams. She makes living worthwhile. Lastly, I welcome our son with my arms open wide as the finishing touches are being put on this book.

May, 2002
Faisal Hoque

Introduction

MY OBSERVATIONS OF BUSINESS AND TECHNOLOGY over the last 15 years compel me to write this book and to answer this question: Why aren't we getting real business value out of technology? One thing is sure—companies that continue to repeat the mistakes of the past will never reap the rewards of the future. Most companies fail to capitalize on the technologies they already have; and many more are poised to meet this same fate with the next big technology fad spawned in Silicon Valley and propelled by venture capitalists. Whether it's wireless, Web services, or the latest and greatest in nanotechnology, companies will never get value—real or perceived—without first solving the business/technology disconnect.

This book will begin by illustrating some of the ways the disconnect can manifest itself in the enterprise. These examples reveal an unequivocal truth: In order to understand, communicate, and plan how they should utilize technology in the enterprise, companies first need to align three key areas—business, process, and technology. But to achieve alignment among these areas requires a fundamentally different approach than those used before—one that brings these disciplines together in a way that all can understand. This approach creates unprecedented

visibility into how business and technology decisions are made, and provides the means for tracing decisions back and forth between the two, so that companies can discover and communicate interdependencies.

This approach is called Business Technology Management, or BTM. In the pages that follow, the principles, activities, and governance that make up BTM will unfold to provide the structure and the mindset to help any company in any industry get real business value from IT.

I am not alone in my views on the disconnect, or in my ideas about what's necessary to solve it. Many chief executive officers (CEOs), chief information officers (CIOs), industry gurus and academics—such as the contributors to this book (some of whom have been grappling with the disconnect since the earliest days of IT)—believe that the time has arrived for companies to adopt a structured approach to aligning business and technology.

What's to Come?

Whether you accept this premise or not, one thing is obvious: The approaches that companies have been relying upon to close the disconnect aren't getting the job done. So what needs to be different in the way companies go about solving it?

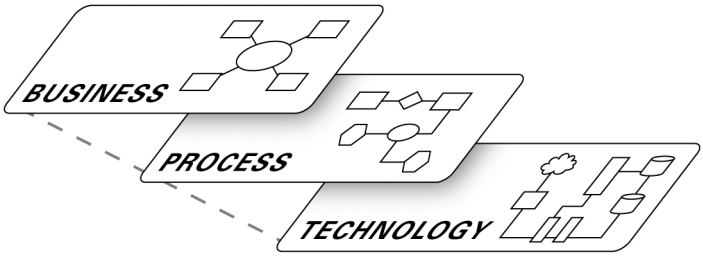
To answer this crucial question, the approach should follow several guidelines. First, the approach should view the problem primarily from the perspective of the business. IT has a long history of considering itself an island apart from the rest of the enterprise. But, like every other business function, IT should service the bottom line first, and then its own needs. This doesn't mean that IT is only about dollars and cents; one of the biggest mistakes that companies have made in the past is failing to recognize the intangible benefits that can come from IT—benefits such as improved customer relationships and better communication between business units. The people who are most likely to recognize and advocate these benefits are business professionals, since

they are often the end-users of technology. It is a mistake not to get this crucial group sufficiently involved in making decisions about how technology can and should impact the business. If IT is to become focused on the business, this trend needs to change.

Second, the approach should focus specifically on the business/technology disconnect, and leave other, more narrowly focused techniques (such as scorecarding or systems design) out of the equation. This means that the solution should zero in on the three key areas that need to be aligned—business, process, and technology—and specifically the connections between them. Often the easiest way to understand this is by forming a picture in your mind similar to what appears in Fig. I.1:

Figure I.1

The three areas that need to be aligned in order to close the business/technology disconnect: business, process, and technology



Third, the approach should enable disparate groups of people with different interests, capabilities, and objectives to visualize and communicate about IT. This includes everyone from the CxO suite on down to programmers and developers. To close the disconnect, all of these people need to be on the same page.

Finally, the approach should solve the problem up front, before the disconnect is cast in stone by expensive and irreversible IT implementations. The logical place for this to happen is in the design stage, where disconnects can be diagnosed, examined, and cured—all before the first line of code gets written.

Obviously, these guidelines leave a lot of room for interpreting how to go about closing the business/technology disconnect. Filling in these gaps is what *The Alignment Effect* is all about.

This book begins with *Part I: The Business/Technology Disconnect*, which introduces the disconnect and uses real-world examples to show the profound effect that it can have upon the enterprise. These examples, which include scenarios from integrated financial systems to human resources to call reporting, illustrate some typical conditions that can result in disconnects, as well as some of the material losses that they can produce. To begin closing the business/technology disconnect, IT departments need to address several emerging challenges. These challenges point to the need for a new approach to align business and technology: the principles, activities, and governance that make up BTM.

Part II: The Principles of BTM, examines three underlying principles that must be in place in order to perform BTM. These principles include predictive modeling, which allows project teams to create blueprints that improve design decisions and facilitate alignment; collaborative decision-making, which includes a broad range of stakeholders to make sure that competing needs are balanced; and making knowledge and assets reusable, which maximizes the value of both intellectual and physical capital.

In *Part III: The Activities of BTM*, we explore business model definition, process optimization, and technology automation—the three activities that companies undertake to align business and technology. The purpose of these activities is to create an end-to-end blueprint of the enterprise architecture that is relevant to a given IT project. In order to create this blueprint, the project team relies on predictive modeling and the other principles of BTM. The activities of BTM begin by capturing a model of the current enterprise architecture, including business, process, and technology. The next step is creating multiple scenario models that correspond with the directions that the project could take. After selecting a final scenario, the final step is implementing the design created in the corresponding model and updating the current model to reflect the changes.

Part IV: Governing With BTM, illustrates how the enterprise should administer BTM to achieve two goals. First, the blueprint developed during the activities of BTM helps senior decision-makers (including the CIO) to set strategic direction for how the business should put technology to work by managing the IT portfolio. Second, the design decisions captured in the blueprint become an important ingredient for helping the company maintain tactical control over their IT projects, including control over quality and cost management. Finally, since governance implies a concerted effort to incorporate BTM into the workplace, I will introduce some key roles and responsibilities for helping BTM make the jump from promise to practice.

The Sum Total

Together, these building blocks add up to a structured approach—BTM—which aligns business and technology so that companies can get real value out of IT. This is the key message of BTM, and also of this book. So even if you decide not to read a word beyond this sentence, remember this point: "BTM aligns business and technology to get real value out of IT."

3

Modeling, Collaboration, Reuse

AT A SOMEWHAT ABSTRACT LEVEL, everybody seems to have a pretty good idea of what a principle is: a "theoretical underpinning", or maybe a "guiding purpose", or a "pillar." These amorphous statements are well and good in the abstract. But for the purposes of BTM we need to be more specific: Before you can even think about using the activities of BTM to align business and technology, you first have to embrace three mutually supportive principles of BTM:

- Utilize Predictive Modeling
- Instill Collaborative Decision-Making
- Make Knowledge and Assets Reusable

How the Principles Work Together

The first principle of BTM, *Utilize Predictive Modeling*, is the most important day-to-day task in BTM. In the broadest sense, predictive modeling is a technique that can be applied to any area where underlying details threaten to obscure overall decisions; where real-world scenarios can be decomposed into distinct elements; and where hidden interdependencies between these elements make it difficult to visualize the overall effect of modifying an individual piece of the puzzle.

Once companies start to utilize predictive modeling, the other principles of BTM automatically become important as well. Modeling is an inherently social activity that draws a broad community of contributors, from executives to business managers to process analysts and technology specialists. Their broad base of interests and varying degrees of expertise makes it essential to *Instill Collaborative Decision-Making*, the second principle of BTM. Modelers also need a way to capture and share the intellectual capital that they create. To achieve this, they need to *Make Knowledge and Assets Reusable*, the third and final principle of BTM.

Utilize Predictive Modeling

The core benefit of the first principle of BTM, whether it goes by "modeling" or something else like "design" or "blueprinting," is that it helps to visualize the end goal before beginning costly—and often irreversible—implementation. In the broadest sense, a model is a virtual representation of a real thing. By manipulating this representation, modelers can preview a solution and address design flaws before they manifest themselves in the final product.

There's a widespread and unfortunate misconception that modeling is a highly technical exercise that needs to be tackled by a team of trained specialists. At times, of course, modeling can be found in pocket-protector-friendly environs like nuclear engi-

neering, macroeconomics, or genetics. But this is more a reflection of inherent simplicity than any tendency towards complexity: By helping to simplify design and decision-making, modeling actually clears up complex problems, which is why it shows up in these areas. When observers mistake modeling for a technical, complicated exercise, they're essentially confusing the message (such as modeling a complex chemical reaction) with the messenger (modeling itself).

Some of the most powerful varieties of modeling (such as the spreadsheet example we'll look at in a moment) allow even non-technical users to preview change, or to "predict," before putting new ideas into practice. This, of course, is where the "predictive" in "utilize predictive modeling" comes from. It's also why modeling is such an important part of BTM: It helps to predict the impact of business and IT change by becoming the "aim" in "ready, aim, fire."

BTM puts modeling to work as an innovation infrastructure for IT projects. During the design stage, it functions as a blueprint in which teams can set clear goals and flesh out a solution before actually writing code. In the build, test, and deploy stages, the model acts as a reference point to orient ongoing work and to help guide last-minute modifications in the event that unforeseen challenges and opportunities pop up. By playing these important roles, modeling helps the IT project team pre-empt costly mistakes and improve the quality of the systems that they develop.

BTM's use of modeling isn't just about making incremental improvements to an existing process, however. In addition to relatively modest gains in efficiency, modeling also empowers BTM with other, more dramatic capabilities that can literally reinvent how IT projects approach the "aim" part of "ready, aim, fire." This sounds like a bold claim. However, there is ample precedent from previous modeling revolutions—such as object modeling, computer-aided design/computer-aided manufacturing (CAD/CAM), and especially financial modeling and the spreadsheet—to suggest that modeling can indeed accelerate critical business activities.

Financial Modeling and the Spreadsheet

Before the personal computer revolution, Wall Street analysts performed complex spreadsheet calculations using only a simple calculator. This process was completely inflexible, prone to mistakes, and thoroughly mind-numbing. In order to make changes to a model (whether to vary inputs or correct mistakes), analysts had to rework the entire thing, a process that—needless to say—was inefficient.

In 1978, Harvard Business School student Dan Bricklin recognized an opportunity to automate this tedious process using software and the rapidly maturing PC. He, along with former MIT classmate Bob Frankston, founded Software Arts, Inc., and introduced the VisiCalc spreadsheet to the market. Almost overnight, VisiCalc transformed how financial analysts worked.[1]

The obvious advantage to Bricklin and Frankston's innovation was efficiency. Complex models that once took hours to update could now be modified with a few keystrokes. Not surprisingly, spreadsheets like VisiCalc became the de facto standard for financial modeling, and frustrated business school students and financial analysts clamored all over each other to put the new technology to use. The demand for spreadsheets was so overwhelming, in fact, that it is frequently credited with creating the initial boom market for business PCs.

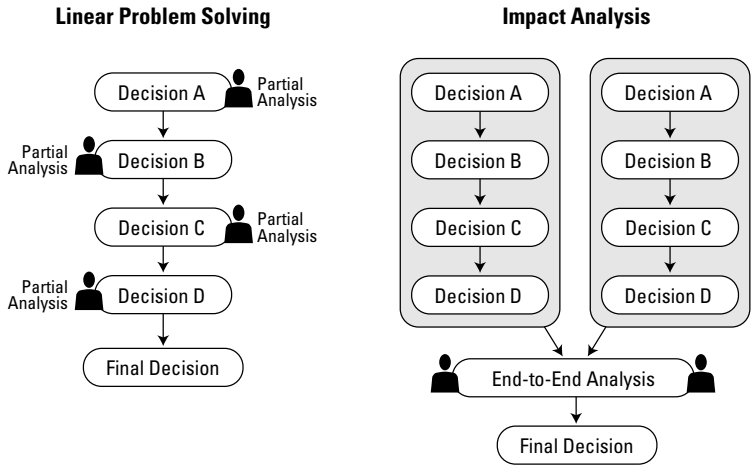
But the real revolution that the spreadsheet kicked off wasn't just about efficiency and automation. By unburdening analysts from the pedantic work of manual calculations, spreadsheets lowered the marginal cost of evaluating new scenarios from thousands of dollars to almost zero. This, in turn, encouraged experimentation and creativity. The same employee who once spent days perfecting a single model could suddenly produce several alternatives in a single afternoon.

Spreadsheets kicked off an industry-wide movement towards experimentation that revolutionized how analysts—and the financial services industry—worked. By allowing workers to easily create and analyze the impact of multiple scenarios, spreadsheets and predictive modeling encouraged a culture of rapid prototyping and innovation, or impact analysis, that is as applicable for aligning business and technology as it is for the financial world.

From Modeling to Impact Analysis

Impact analysis lets teams alter input factors, create multiple output scenarios, evaluate the end-to-end impact of each, and eventually select and implement the optimal solution. This stands in direct opposition to conventional, linear problem-solving techniques, where decision-makers analyze sub-problems at each logical step along the way, and then assume that the overall impact of their choices is the best one (see Fig. 3.1).

Figure 3.1
Linear problem solving decomposes sub-problems along the way, while impact analysis examines the end-to-end impact of multiple decisions



Like modeling in general, impact analysis can be used to address a broad range of activities. For example, it is often used in supply chain planning for advanced, data-driven calculations that optimize a particular function (such as inventory costs) given unique inputs and constraints (such as market demand, logistical restrictions, and manufacturing capabilities). At the other end of the spectrum, impact analysis can address much simpler problems. A good example is Dell Computer's build-to-order website, where potential buyers test multiple PC configurations until they find a

good match between the features they want and the cost they can afford to pay. In both of these cases, individuals vary inputs, rules translate these inputs to outputs, and team members compare the impact of multiple scenarios to choose the solution that fits their needs.

In order for impact analysis to work, the scenario being modeled should conform to three guidelines:

- **It should have easily identified inputs, rules, and outputs:** Impact analysis requires employees to define a set of inputs and then link these to outputs using predefined rules. These inputs and outputs are often quantitative (as in the supply chain optimization problem), but they can also be qualitative (such as the PC configuration options). To produce good results, these criteria—the rules that link them—must accurately reflect the real-world problem.
- **It should have multiple configuration options and decision factors:** Problems that contain only a few inputs and outputs aren't suited to impact analysis because the effect of altering inputs is often obvious. When the outputs are less intuitive on the other hand, impact analysis can help decision makers experiment to identify good solutions.
- **The relative cost of implementation to design is high:** Scenarios that are inexpensive to design but difficult to implement are ideally suited to impact analysis. Our ongoing analogy to an architectural blueprint is a case in point here: It's unrealistic for you to contract a builder to build five houses so that you can choose the one you like the most. It's entirely possible, however, that you may choose to commission an architect to draft five blueprints. You can then compare them, choose your favorite, and give it to the contractor to build. This is where the synergy between modeling and impact analysis really comes into play: Predictive modeling is a powerful tool for lowering design costs, and so a crucial driver for impact analysis.

Anticipating Unforeseen Ripple Effects

These three characteristics combine to highlight a point that is crucial to understanding why impact analysis fits well with

BTM. Disconnects between business, process, and technology are often introduced when individual decisions have unforeseen effects on the blueprint as a whole. "Projects lack a holistic view," PACCAR CIO Pat Flynn says, "because we tend to look at it as a linear process: decompose the problem, decompose the problem, decompose the problem, make a decision. But it's very hard to go back and say 'that decision has a set of ripple effects'."

Consider an example: A team of process analysts is working on a project for which they need to diagram the approval process for purchasing non-production goods. Using conventional methods, their actions would be informed by an in-depth analysis of the decision. They would start by gathering as much data as possible: the current approval process; the complete list of approved suppliers, products, and contract types; the organizational hierarchy and current purchasing limits for each employee; the existing technology assets that automate this process; and the supporting systems such as hardware and networks. After pulling all this information together, they would weigh the data, diagram a process flow that best fits the given constraints, and sign off on the decision.

This sounds reasonable at first glance, but it fails to take into account any ripple effects that might spread from this individual decision. Let's say, for instance, that one supplier relied on a legacy order-processing system to interface with our example company's procurement system. Let's also say that when our team reengineered their approval process, they did so in a way that made it incompatible with this legacy application. And finally, let's say that this particular supplier accounted for 40% of all purchases of non-production goods last year. Clearly, this should compel the process analysts to revisit their decision. But without impact analysis they wouldn't find out about the ripple effects until it was too late.

The Perceived of Value of Models and the Whitespace Problem

Before they can get started with modeling and impact analysis, companies need to overcome a couple of obstacles. The most obvious is the common perception that the time it takes to

develop a model during the design stage is better spent on implementation. This is due in part to previous experiences with models that were frighteningly inaccessible to all but the most die-hard experts. Since non-specialists (a group that frequently includes managers and other authority figures) couldn't experience their value firsthand, they assumed that the models were a waste of time. The shorthand solution to this concern is to make the modeling environment friendly enough for a broad range of people to pick it up and experiment according to their own level of comfort. A good example of this is a financial model whose inner workings may be exceedingly complex but whose overall purpose is clearly communicated to a non-technical audience.

In extreme cases, however, modeling can be a waste of time. This happens when people get stuck in an endless design loop; By continuously tweaking the model in the quest for a perfect solution, they never get around to actually implementing what they're working on. The way to counter this impulse is by linking a system of real-time monitoring to metrics, goals, and objectives that are established at the beginning of the project. This implies a link to both project and performance management that is crucial to any type of modeling.

The other obstacle that stands in the way of modeling and impact analysis is the gap that exists between multiple models and between models and the real world. These gaps are referred to as "whitespace," and they're familiar culprits in cases where modeling hasn't been successful. Typically, the tools that are available to IT workers to model business, process, and technology are disjointed, and so they tend to exacerbate rather than overcome the whitespace problem. Most are geared either to a particular task (process modeling, object modeling, or knowledge management) or to broad horizontal activities (word processing, drawing, or spreadsheets). A consequence of these disjointed offerings is that companies tend to use multiple tools and environments to develop their models. When changes are made in one environment (say a process diagram) they aren't automatically reflected in other areas (a requirements document or business strategy memo, for example). Without integrated tools, the project team has to proactively anticipate ripple effects to keep their models aligned.

The Advantages of Predictive Modeling

The advantages that modeling provides for BTM are closely analogous to those that spreadsheets deliver in the financial world. By utilizing predictive modeling to align business and technology, enterprises can:

- **Mitigate risk** by forcing teams to flesh out details in the design stage
- **Enable creative impact** analysis by lowering the marginal cost of experimentation
- **Democratize design decisions** by hiding underlying details from non-technical team members
- **Communicate overall design** to promote collaboration

Mitigate Risk

The first of these advantages, mitigating risk, is a key advantage of modeling in general. Initiatives can fail because of any number of unforeseen obstacles: poorly defined business objectives; processes that don't map to application packages; system choices that require heavy customization; even plain, old-fashioned installation failures. By itself, modeling can't guarantee a flawless initiative; but by forcing stakeholders to collaborate and produce an end-to-end design before beginning the actual implementation, it helps work out kinks in the model—where they are far easier to tackle than in the real world.

Mitigating risk is an important factor in any enterprise initiative, and it's a compelling counterbalance to our first concern about predictive modeling—that it isn't worth the time and effort. Implementation mistakes can cost many times more than even the most thorough modeling.

Perform Impact Analysis

Second, predictive modeling helps companies to perform impact analysis. Most enterprise initiatives adhere to a linear planning process, where decisions made early on (the business drivers for the initiative, for example) become cast in stone as the project progresses. This is okay when both the initial guidelines are

completely static and the consequences of decisions only affect future decisions.

In IT projects, however, neither of these conditions applies. Early choices such as business drivers can become out-of-date at a moment's notice in response to things like market changes and recent moves by competitors. At the same time, choices made later in the process (such as which application package to select) can affect decisions thought to have been nailed down earlier (such as the process flow that is to be automated). By locking in determinations up front, teams forfeit flexibility that they may need down the road.

Also, linear planning assumes that what's best for any individual decision must be best for the project as a whole. This attitude ignores hidden ripple effects between seemingly unrelated decisions. For example, a consultant choosing an application package may sensibly select the one that fits the most requirements. But this decision assumes that all the requirements are equally important to the initiative. If the consultant chooses a package that leaves out a few crucial requirements, he or she could introduce an inconsistency between the best individual decision (the package that meets the most requirements), and the best overall solution (the system that best supports the overall business goals of the project).

To compound this situation further, ROIs are frequently laced with intangibles such as "improved customer relationships" and "strategic fit with other systems." Managers who have been tasked with making a particular decision in a linear process often feel compelled to invent decision criteria to justify their choices, even if these criteria fail to take into account the project's overall, intangible returns. Eric K. Clemons, a professor at the Wharton School of Business, describes this phenomenon as "the 'concrete' and 'measurable' driving the *significant* out of the analysis."[2]

Impact analysis counters these concerns by letting teams compare end-to-end potential outcomes. Even in cases with intangible returns, the impact analysis technique improves decisions by making it easy to compare the relative value of multiple scenarios, rather than forcing teams to assign allegedly absolute criteria that obscure more important, elusive goals. Seeing end-to-end designs

also helps to calm the impulse to enter an endless design loop by encouraging teams to select a final design, move from modeling to implementation, and avoid the temptation to get stuck on an individual decision.

Democratize Design Decisions

The third advantage of predictive modeling is that it hides underlying details from the non-technical audience. By simulating the general behavior of real-world subjects while simultaneously hiding complex details, models encourage even non-technical team members to "play around." This broadens the base of users who can make important design decisions from IT professionals to also include business managers, process analysts, and even senior executives. Collaboration between this variety of stakeholders to leverage business and technical expertise leads to new scenarios and innovative solutions to problems. Michael Schrage, the co-director of the MIT Media Lab's eMarkets Initiative and the author of *Serious Play*, describes how this phenomenon plays out in another modeling discipline, computer-aided design, or CAD:

> Engineering organizations have found that nonengineering managers and marketers want to play with CAD software to test their own product ideas and enhancements. Such "amateur CAD" signifies a growing democratization of design promoted by pervasive and accessible modeling technology. The changing nature of the modeling medium is forcing design professionals to manage the prototyping efforts of design amateurs. The declining cost and rising importance of prototyping is broadening the community of designers.[3]

Communicate Design Details

Finally, models can be compelling communication tools. This can happen in the form of a business unit evaluating an existing enterprise system to see if it could be reused in their division; a development team communicating a proposed project to a manager for approval; or an enterprise architect team communicating interface specifications to an external business partner for integration pur-

poses. This communication is also the key to bridging gaps between distinct models and ultimately to overcoming the white-space problem.

Instill Collaborative Decision-Making

The second principle of BTM is to instill collaborative decision-making. The concept of collaborative decision-making is frequently employed as a catchall that includes everything from face-to-face communication to knowledge management to coordinating partnerships. This scope is too broad for our purposes, of course, so this discussion is limited to the role that collaboration plays in the specific context of BTM: decision-making that is either facilitated by modeling itself or undertaken to support the modeling initiative.

The idea of collaborative decision-making in BTM is a descendent of the broader concept of a virtual workspace, where potentially disparate teams can come together to access a common work environment, post and share supporting information, and communicate in real time to solve problems. For BTM, this virtual workspace equates to a combination of the model itself and three key levels of collaboration:

- **Direct Collaboration** is when people discuss issues in real time using tools like email, instant messaging, and notification services. These discussions are meant to facilitate dialogue between decision makers or to solve a specific problem. For example, an implementation consultant may need to establish which IT standards are in place through a direct question-and-answer session with members of the client team.
- **Model-level Collaboration** happens when more than one team member contributes to any individual model. This occurs quite frequently, such as when analysts require supervision and input from managers, or individual models span multiple skill areas or business units. A good example of model-level collaboration is a supply chain process model, where demand planners, plant managers, and supply plan-

ners come together to diagram an end-to-end flow of how a manufacturer plans and executes their supply chain. Model-level collaboration includes model check-in/check-out, version control, change tracking, and model comparison/merge activities. This level of collaboration can also include aspects of document management to help teams share knowledge that supports their decisions in the model. And it can also act as a gateway to direct collaboration, for example when an inconsistency between two versions of a model is discovered and the team collaborates to determine which version is correct.

– **Alignment-level Collaboration** represents the highest level of collaboration in BTM. It is driven by the necessity to cross whitespaces to align multiple models. Because BTM spans business modeling, process optimization, and technology automation, it by nature includes a variety of stakeholders with unique areas of modeling responsibility. To cross these disciplines, team members often negotiate and come to a shared decision. This may involve a prolonged, robust exchange of information that includes elements of both model-level and direct collaboration. To facilitate back-and-forth exchange, team members utilize a mini-impact analysis of sorts, where each side develops multiple scenarios until an acceptable compromise is reached. A good example of alignment-level collaboration is when analysts from two business units compare process models to establish standards for enterprise processes.

Vertical and Horizontal Collaboration

The three levels of collaboration can occur both vertically (within a single business unit or team) and horizontally (across multiple business units or teams).

Most day-to-day communication within an IT project falls under the aegis of vertical collaboration. Its goal is to improve existing processes by sharing information and expertise. One manifestation of vertical collaboration is communication between team members at different levels of the same business unit, from executives to business unit heads to managers and so on. In the

worst cases, top-to-bottom communication between those who set objectives and those responsible for meeting them resembles a version of the children's game, Telephone: The original message is garbled along the way and disconnects crop up between strategy and execution.

Vertical collaboration improves this process by making sure that the directives passed between managers and their reports happen accurately and in real time. For top-down communication this means that changes in strategy or goals are communicated in time to change course, and for bottom-up communication this means that needs and issues are passed back up to executives to make small, corrective changes that don't jeopardize the project as a whole.

However vertical collaboration isn't necessarily limited to members of the same business unit. Another type of vertical collaboration focuses on particular teams or business processes. An example here is product development, when representatives from marketing, sales, and engineering define specifications, share new product designs, and make update requests. The impetus for this collaboration is improved communication and efficiency: The marketing team knows which market niche to exploit, the sales team understands customer needs, and engineers have the technical capability to design new and exciting product offerings. By improving the flow of information between participants, tools that facilitate vertical collaboration in product development can improve speed to market and reduce production errors.

In BTM, vertical collaboration shares important characteristics with both manager-to-report collaboration and process and team-based collaboration such as product development. By encouraging team members to share metrics, project management information, and relevant knowledge bits, collaboration encourages holistic decision-making, and ultimately reduces development time and cost.

While vertical collaboration is all about efficiency, horizontal collaboration is focused on helping to share amorphous "great ideas" that can deliver unique insights that are especially powerful. Vertical collaboration is project and process-based, and includes stakeholders with multiple specialties. Horizontal collaboration

is quite the opposite: General trends and opportunities are shared between employees with similar job functions, but who work in different business units or on different projects.

One example of horizontal collaboration could be the interaction between the customer service and product design teams in a consumer products company. Suppose that over time, the customer service team notices that a large number of the calls to their help desk are from users who can't figure out how to use a particular feature of a particular product. After documenting the issues, a service team member contacts the product design team. The two groups collaborate to determine the exact nature of the problem and change future versions of the product to make it more intuitive. In this example, two otherwise disparate teams (customer service and product design) collaborate to share a unique insight (user difficulties with a particular product feature) in a way that was outside the scope of normal processes and regular communication.

The advantages of horizontal and vertical collaboration are predictably unique from one another. In vertical collaboration, the focus is on pervasive integration of well-defined team members and processes in order to share knowledge and improve efficiency. Horizontal collaboration, on the other hand, requires employees to identify and analyze important developments in their own work environment, and then to pass these along through free-form interactions to whomever is most equipped to act upon them. This is the foundation for an integrated organization that recognizes broad trends and shares them across business lines to provide opportunities elsewhere.

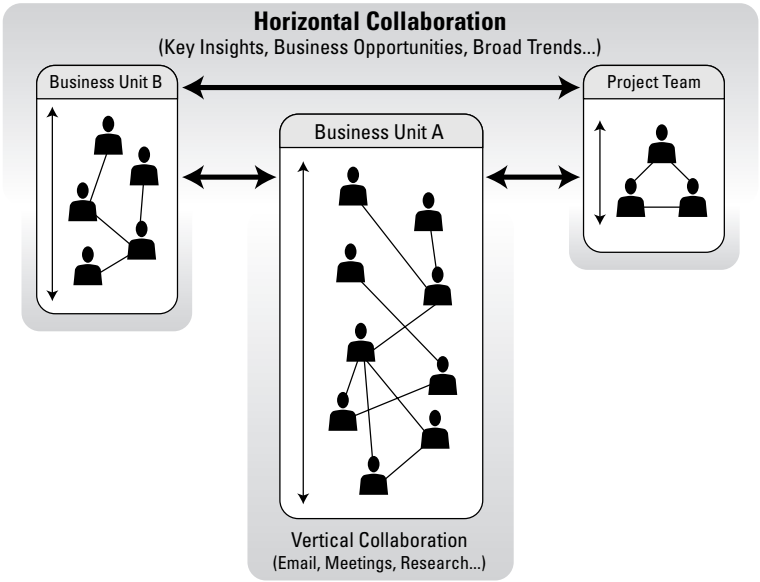
T-Shaped Managing

Both vertical and horizontal collaboration are essential components of BTM. Embracing both in tandem requires a management technique that Morten T. Hansen and Bolko von Oetinger describe in the Harvard Business Review as the "T-shaped management" model. In BTM, the vertical component of T-shaped management encompasses most day-to-day work on IT projects, and focuses on individual modeling teams and their managers on up to the office of the CIO and the CxO Suite. But BTM also

requires teams to collaborate horizontally to share what Hansen and von Oetinger call "implicit knowledge, the type needed to generate new insights and creative ways of tackling business problems or opportunities."[4] These horizontal interactions could include a marketing manager who identifies a sales trend and passes it along to a product design team, or an IT professional who recognizes an opportunity to reuse an existing ERP system in another department. Figure 3.2 illustrates the roles that vertical and horizontal collaboration play in BTM, and shows some types of information that are commonly exchanged in each:

Figure 3.2

Vertical collaboration encompasses day-to-day work, while horizontal collaboration delivers key insights and opportunities



Contextual and Cultural Barriers

Before they can achieve T-shaped management, companies need to overcome both contextual and cultural barriers to collaboration. Contextual barriers are the biggest obstacle that stands in the

way of collaborative decision-making. Most collaborative systems, including groupware or virtual workspace applications, don't integrate directly with everyday work environments, so employees are forced to leave their workspace—be it a word processor, spreadsheet, CAD/CAM tool, or even the factory floor—to interface with others. IT analyst IDC describes this phenomenon as a "schism between how people get information and what they can do with it."[5]

For vertical collaboration, the contextualization problem is more practical than anything else: Team members know what to share and with whom, but many times lack the infrastructure to communicate within their familiar business applications. In horizontal collaboration, however, the impetus for collaboration isn't as intuitive. Issues are less likely to be explicitly documented in the first place, and it can be difficult to determine who to collaborate with, as partners come from outside the immediate team or from different business units altogether. This means that not only do employees not know *how* to collaborate, but they also don't know *when* or *with whom* to do so.

People also fail to collaborate because of ingrained cultural and organizational issues. In the simplest case, they fail to recognize either the person with whom they should be collaborating or the need to collaborate at all. A process analyst faced with choosing to modify either a current purchasing process or a new procurement application, for example, might not know that a colleague in another department recently grappled with a similar problem, and so might be a good source of knowledge and advice.

A second, more deep-seated challenge is to overcome the strict concept of ownership that impedes collaboration—especially horizontal collaboration between business units. There are innocent and not-so-innocent reasons why this happens. Sometimes, people simply assume that they should solve their own problems, and consequently miss opportunities to collaborate with peers who may have valuable insight into their dilemma. Other times, cultural barriers get in the way. Information from outside the immediate team may be considered untrustworthy. Or, in other cases, knowledge producers may fall prey to an ingrained tendency to hoard information for their own personal advantage. In organ-

izations where employees compete internally (to acquire customers, for example), this last condition may require a system of incentives and penalties to encourage open information exchange.

The Advantages of Collaborative Decision-Making

Collaborative decision-making provides a number of important advantages for BTM. By combining vertical and horizontal collaboration to employ a T-shaped management model, enterprises can:

- **Achieve** the BTM equivalent of concurrent engineering: simultaneous and synchronized business modeling, process optimization, and technology automation
- **Maintain** alignment and communication between decisions made in disparate environments

Achieve Concurrent Business, Process, and Technology Design

The first advantage of collaborative decision-making is that it helps companies to achieve the BTM equivalent of concurrent engineering, where manufacturers collaborate at every stage of the value chain so that all aspects of product development—from engineering to marketing to manufacturing design—can be carried out simultaneously. Collaborative decision-making does the same for IT projects by allowing each activity of BTM—business model definition, process optimization, and technology automation—to occur simultaneously. When both product design and BTM occur concurrently, cycle times decrease and critical issues in quality control are addressed early on in the process.

Maintain Alignment Between Disparate Decisions

The second advantage of collaboration is that it helps team members to make intelligent trade-offs that maintain alignment between seemingly disparate decisions. When companies employ multiple tools for each of the three activities of BTM, they invite disconnects between choices made in separate environments. By collaborating to unify decision-making across multiple environments, team members can provide visibility into choices that are

made in other areas of the project. For example, an implementation consultant may need to determine why a modification was made to a process in order to balance its relative importance against the changes to the technology infrastructure that it requires. By implementing collaborative decision-making, team members can identify and bridge these whitespace disconnects to maintain alignment across the board.

Make Knowledge and Assets Reusable

The final principle of BTM, to make knowledge and assets reusable, encompasses two concepts that are well-known to both business and technology audiences. The first of these is knowledge management, where companies capture, codify, and communicate knowledge to improve decision-making. The second is a repository that stores templates and previously designed models to encourage project teams to reuse the unique knowledge captured in models.

Knowledge Management

The first component of knowledge and asset reusability is knowledge management—an idea that first rose to prominence nearly a decade ago. Not surprisingly, knowledge management first caught on in businesses where knowledge is a key component of the value proposition: "There's too many terms that have been overused recently," Scott Hayward, a Managing Director at JPMorgan Chase and Company explains, "but knowledge management has already become a reality in industries like financial services and consulting, where knowledge is your main product."

At the simplest level, knowledge management includes three sequential steps:

– **Acquisition:** Enterprise knowledge frequently exists in intangible forms such as individual expertise and shared culture. To disperse this knowledge throughout the corporation it first must be captured in a concrete form such as a document, knowledge bit, or contact information for a subject-matter expert.

– **Interpretation:** Once knowledge has been captured it must be analyzed and codified so that individuals and intelligent systems can use this context to push relevant knowledge to team members.
– **Delivery:** The final step is delivering codified knowledge to the point of decision. This delivery can be either passive (such as documents that reside in a searchable database or team members who wait to be contacted about their specific experiences and recommendations) or active (such as software designed to alert individuals regarding applicable knowledge bits).

This seems to be a simple process, but the hit-or-miss experiences with knowledge management during the last decade betray the danger lurking behind the facade. To avoid the mistakes made in past projects, companies need to appreciate what it is that makes the outwardly simple theory of reusable knowledge anything but simple to implement in real life.

Two pervasive myths are largely responsible for companies' inability to harness the power of shared knowledge. The first is based on the assumption that employees will automatically use an IT-based knowledge management system if it is in place. This misconception stems from the early view that knowledge management was considered purely an IT project. But companies found that building technology to support knowledge management is the easy part—and overcoming cultural and political obstacles to sharing knowledge is much more difficult.

The second myth about knowledge management is that technology will replace face-to-face knowledge transfer. Some early adopters assumed that in the new, virtual office, all interaction would be mediated by IT. The truth is that people are far more likely to share ideas when they're face-to-face with their colleagues, and IT-based knowledge management should be considered a supplement to rather than a replacement for traditional, non-IT-based knowledge exchange.

Two Types of Reusable Knowledge: Documents and Relationships

Knowledge management links people with two types of information: documents (which include pre-built process flows, existing

market research, network topologies, and other supporting information); and relationships, (which means referring to subject-matter experts—business unit managers, network architects, and IT team leaders for example—directly).

In keeping with knowledge management's IT-focused history, most of the attention given to reusability centers upon collecting, indexing, and distributing electronic documents. For this to work, of course, knowledge must first be captured and saved in document form and then given context through associations with predefined subjects. When employees search for knowledge, they either perform a direct search (in which case context is provided by their search terms), or they browse the subjects until they find something that might apply, and then view the documents that are associated with that subject. This type of knowledge management works best for information that is static, data-driven, and meant to have a long shelf life: metrics, research reports, and basic documentation such as corporate policies, for example.

But sometimes sharing knowledge requires two employees to collaborate directly to adapt their unique experiences to a new context. In these cases, document management systems—the traditional cornerstones of knowledge management—don't work so well. Instead, companies need a mechanism for linking people directly with other team members or experts. When employees look up information, they are directed not to a static document, but instead to the appropriate contact person.

Reusable Asset Repository

The second crucial component of knowledge and asset reusability is a repository that stores models developed during BTM. The concept of a reusable asset repository is closely related to the knowledge management ideal of recycling enterprise knowledge. It differs from knowledge management, however, in that the knowledge being reused is captured in a structured model rather than static documents or contact information for subject-matter experts.

Reusable asset repositories are familiar to component and object developers, who have long used repositories to encourage developers to recycle existing code rather than writing from scratch. Component and object repositories act like a centralized ware-

house of pre-developed software that codifies the objects according to the functionality that they implement. Developers search the repository to find a piece of code that does what they need, and reuse it to decrease the development time for their project.

A useful analogy illustrating the advantages of a reusable repository is to the manufacturing innovations realized during the industrial revolution. By using standardized components as building blocks for creating new products, innovative entrepreneurs such as Eli Whitney incited a productivity revolution that led to assembly line manufacturing, the transition from inefficient artisans to moderately skilled line workers, and ultimately to the rise of mass production and inexpensive consumer goods.

Proponents of reusable repositories promise a similar leap forward for BTM: By using pre-built model templates from a repository, team members can concentrate on developing unique project details rather than common, low-value designs. This provides important advantages for companies whose IT projects need to be agile to keep up with multiple acquisitions, fast product cycles, or high employee turnover.

Reuse in Context

As with collaboration, it is necessary to establish context before you can reuse knowledge and assets to give employees not just the right information, but also the right information at the right time. The very idea of reuse as a distinct practice betrays the fundamental problem with most previous initiatives to reuse knowledge and assets. Like knowledge management, reuse isn't just about deploying business applications to save electronic knowledge for later use. Instead, it means enacting a cultural change so that reusing decisions, policies, processes, technology, and standards is indistinguishable from the normal, day-to-day tasks that created this intellectual property in the first place.

One recurring pitfall of stand-alone systems for reuse is the tendency of employees to ignore them altogether. Integrating knowledge directly into the work environment solves this disconnect and increases the likelihood that employees will embrace reusability both as producers and consumers of knowledge. To do this means facing two important challenges: establishing an infra-

structure for reuse that integrates directly with other enterprise applications, and defining a methodology for classifying documents that can be linked to enterprise applications to provide the context for determining which knowledge is relevant at any given time.

The Advantages of Reusing Knowledge and Assets

By reusing knowledge and assets within the context of BTM, enterprises can:

- Give decision-makers the right information at the right time
- Minimize rework and improve cycle times
- Establish enterprise standards for processes, systems, and infrastructure to promote best practices
- Reuse existing enterprise applications, hardware, and networks

Give Decision-Makers the Right Information at the Right Time

Knowledge about business and IT initiatives is stored in the form of market research, documentation, vendor profiles, and consulting partner deliverables. By incorporating this information into a knowledge management system, teams can use context to push relevant information directly to the point of decision. This helps team members to access existing enterprise knowledge before making key decisions, and ensures that documents remain up-to-date and relevant as the model is updated or changed altogether.

Minimize Rework and Improve Cycle Times

By saving previously developed models in a reusable asset repository and then making these available as templates for later projects, companies can reduce the amount of time and effort that they spend redoing crucial tasks. This lowers the cycle time required to plan and implement IT projects, and allows individuals to concentrate on high-value decisions in their specific areas of expertise. Even after the dotcom meltdown, valuable IT workers are in short supply, and forcing skilled subject-matter experts to spend time on activities that don't provide a direct benefit to the project is an inefficient allocation of resources. By reusing models

from a centralized asset repository, IT workers can concentrate on specific, detailed customization that delivers real value and leverages their unique skill sets.

Establish Enterprise Standards and Best Practices

Oftentimes, enterprise and IT standards are ignored by employees because they are either unaware that the standards exist or they remain unconvinced of the value that they provide. Knowledge and asset reusability addresses this concern in two ways.

First, contextualized knowledge links standards and best practices directly to the model itself. This can be in the form of supporting documents, research reports, or team member experiences. Also, it can link directly to subject-matter experts, such as enterprise architects, who can pass along their accumulated knowledge to those responsible for individual design decisions.

Second, new models based on templates that conform to standards and best practices encourage teams to keep new modeling in line with the design parameters endorsed in the template. To replace an approved networking standard with a renegade design, for example, an IT architect would have to first deliberately remove the approved configuration. This is unlikely, especially in a culture where a standards-based approach is emphasized. Another way to enforce standards is to include models of technology vendors and configurations in the repository. This makes it easier for IT architects to stick with pre-approved configurations than it is to strike out on their own.

Reuse existing physical assets

By recycling models from previous BTM projects, team members are encouraged to reuse the design decisions captured in the model itself. At the same time, however, it is important to note that these previously developed models are virtual representations of the actual business and IT environments. By recycling a portion of a model, then, employees can often recycle its real-world equivalent—strategies, processes, software, and systems, for example.

Consider this scenario: A particular line of business develops a model for a new CRM initiative, installs the software, and rolls out the project in their business unit. When IT workers from

another business unit go to reuse this CRM model, they not only benefit from improved decision-making, but by sticking with the model's design decisions, they may be able to reuse a portion of the actual CRM software itself.

By reusing actual enterprise assets rather than just the knowledge and expertise encapsulated in the model itself, companies can reduce the cost of purchasing new hardware, software, and services, and can unify enterprise architecture across multiple lines of business.

From Principles to Specific Activities

The three principles of BTM combine to form a solid foundation for aligning business and technology. Without utilizing predictive modeling, instilling collaborative decision-making, and making knowledge and assets reusable, it's impossible to do BTM. This means that the principles of BTM merit a long and careful look before you dive into your next IT project.

Who Should Lead the Drive to Adopt the Principles of BTM?

"Right now, many corporations don't have a BTM hero who has been tasked with leading the drive towards modeling, collaboration, and reuse. And even where those people exist today, they typically don't have the budget to marshal the resources to do it.

Like any important shift in IT planning, embracing predictive modeling starts with the CIO. He or she may assign somebody else to tackle it, but I think it's got to be very high level. I do think, however, that over the next two or three years you'll see process-focused technology people start to play this role by acting as purveyors of modeling concepts to both sides: to the business side to

help them understand what technology can do for them; to the IT group to actually get development done right.

It's these same business process/technology leaders who will be the lynchpins for driving collaboration, and putting the right tools and processes in place to make it happen. And I'd also argue, by the way, that it's these same people that have to start looking at reuse and knowledge management because they're the ones who see things on a cross-functional basis, whether it's cross-departmental, or sometimes even across business partners. I think you really must have a group that is looking after the whole development area on reuse, because reuse starts at the process level: if you can't establish shared processes it's going to be difficult to establish component reuse at a technology level.

People are already arguing 'yes' about alignment, but I think we're at the cusp of where we're going to see this discipline become a critical path, enabling better control of IT spending, better management of projects, better prioritization, and viewing the whole thing as a portfolio. I think that you're going to see a much more coordinated effort. In the past, business/technology alignment has been done more on an ad hoc basis. But today, you need a more architected approach: It needs to be more disciplined, and you need to be able to put different areas to work in pursuit of alignment, including modeling, collaboration, and reuse."

– **Dale Kutnick,** *founder, chairman, and CEO, META Group*

Despite this enthusiastic endorsement, however, it's important to remember that the principles of BTM are only one piece of a bigger puzzle. Early on in this chapter we defined the principles as prerequisites for performing the activities of BTM. This is a good way to emphasize the importance of these principles and how they

fit with the other pieces of business technology management: It's impossible to do successful BTM without utilizing predictive modeling, instilling collaborative decision-making, and making knowledge and assets reusable. But it's also possible to do these things—to do them well, in fact—and still not make good on the promise of BTM.

Index

C

D

E

F

G

H

I

J

K

L

M

N

O

P

R

S

T

U–V

W

Z