

Redesigning Enterprise Processes for e-Business

**Includes CD-ROM with
WorkflowBPR Process Modeling
Software from Holosofx Inc.**

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PREFACE

PREFACE

This is the decade of redesigning enterprise processes for e-business. While creating a process advantage has always been a formidable strategic weapon for business enterprises, a new urgency for a different form of business process redesign or reengineering (BPR) has been ignited by e-business.

At this writing I cannot imagine any career in line management that will not require basic skills in BPR for e-business. Whether you are in a start-up that is trying to design new marketing processes around the Internet, or in a large traditional brick-and-mortar enterprise that is redoing its supply chain for e-business, or in a Big 5 consulting company with an electronic commerce practice, or in a nonprofit company that is restructuring web-based customer service, or whether you work in Stockholm or Singapore, you will definitely need skills in BPR for e-business. The career advancement opportunities that it opens are endless.

As we enter the 21st century, the rapid progress in the capabilities of the Internet and information technology infrastructures are enabling enterprises to create value in new and exciting ways. In this customer-centered high velocity environment an enterprise's business processes must be fast, focused, and flexible. Business-to-business electronic commerce is coming together with physical supply chain management and is coalescing into an information-rich combination called e-business. Moreover, the focus of business process redesign has shifted to include cross-enterprise processes partly executed by one enterprise and partly by another. Competitive pressures and value creation opportunities have never been greater for enterprises to redesign their business processes.

In such an environment, business professionals need to learn how to describe, analyze, diagnose, and redesign a business process through robust BPR methodologies and tools. In an era of e-business, redesigning a business process involves more than restructuring the workflow. It also involves changing the information flows around the business process and changing the knowledge management capabilities of the process by harnessing the collective intellectual assets around it. This book is targeted to the practicing or future business professional who would like to learn how to carry out such BPR in e-business settings.

There are many books and 'how' articles on the 'why' and the 'what' of BPR. However, that is not the case with the 'how' of BPR, and especially not in the case of e-business. There are also many books and articles about managing the organizational change efforts that are needed to make the implementation of BPR successful. There is, however, noticeably much less publicly available about the nitty-gritty of the how that is needed to redesign and improve business processes. The how of design appears to be kept within the proprietary domain of consulting companies and is relatively unarticulated and underdeveloped in the public domain. Existing books provide little hands-on progressive experiential learning. Neither do they provide a *business-oriented BPR software tool* and an accompanying step-by-step BPR methodology to enrich the quality of the learning experience. Most importantly, at this time there are no books that address these BPR issues in an e-business context. This book is designed to fill all these gaps.

This book prepares you to be a full-fledged participant in any process redesign effort for an enterprise in this era of e-business. It provides basic understanding of business process redesign concepts, a how-to guide for redesigning business processes, and accompanying business process modeling software on CD-ROM. The software is a limited version of a leading-edge commercial software package, *Workflow-BPR Modeler* from Holosofx Inc. that runs on any standard Windows-based personal computer. This book also provides a series of case studies and examples based on real company experiences that the engaged reader can work through with the software. In addition, the book provides a supply chain view of business processes that is geared to e-business. The book is also augmented with updates and tips accessible through McGraw-Hill's Internet website.

This book can be used in classroom settings, on the job, and in a self-guided learning mode. It assumes only that the reader/learner has an intelligent understanding of how a business works and that he or she has basic *point-and-click* computer literacy in order to use the software and navigate through it. For university classroom settings, the book is designed to be used in business process reengineering courses that want to be relevant to current e-business settings; in electronic commerce and e-business courses that want to provide concrete process redesign methods for e-business; and for supply chain management courses geared to e-business. The book is also helpful for courses in these topics that include actual field projects during the course of the semester.

Whether your passion and interest is business process consulting, e-business, information systems, electronic commerce, operations, or supply chain management, this book is geared to prepare you to be a full-fledged participant in BPR and e-business initiatives. Go conquer!

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There are also a number of colleagues, friends, graduate students, and institutions whom I would like to especially thank. The Zyco insurance example in Chapter 6 is adapted from field work and modeling by Les Sunohara of Holosofx who also provided detailed commentary at short notice. Il Im, Ph.D. candidate at the USC Marshall School of Business, painstakingly smoothed rough spots in the flow and exposition of the examples in Chapters 5 and 6. Chapter 7 draws on joint work between the RosettaNet Consortium, Holosofx, and the USC Marshall School of Business. Thanks are due to the pioneering efforts of Fadi Chehadé, RosettaNet CEO, for creating such an exciting and forward-looking context for e-business, with whom I really enjoyed working over the last two years. The examples in Chapter 7 are adapted from modeling by Eric Olson and Jasmine Basrai of Holosofx. Dale Miller, a vice president in the banking industry, provided very helpful input to Chapter 4. Gamal Shohaie of Holosofx provided the design of the example in Chapter 5. Mike Laube helped configure and test the CD-ROM, and Steve White and Jeff Reed all of Holosofx also provided much help on several occasions. Christoph Bussler of Netfish Technologies kindly read Chapter 8.

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NAVIGATION GUIDE TO USING THIS BOOK

The book is divided into two parts:

- **Part A: Understanding BPR for e-Business** Part A provides a general understanding of the concepts and issues of business process redesign (BPR) in the context of e-business.
- **Part B: How to Redesign Enterprise Processes with BPR Software** Part B provides a step-by-step progression of how to redesign enterprise processes and supply chain processes with BPR software through examples. Part B takes advantage of the Holosofx Workflow-BPR software on CD-ROM that comes with the book.

Part A consists of three chapters.

Chapter 1: Introduction to BPR for e-business

Chapter 1 provides an introduction to BPR and e-business and their relationship to how business enterprises go through organizational change. It provides an overview of how BPR projects work and also provides a general orientation and introduction to the book.

Chapter 2: Key Issues around BPR and the Evolution of BPR for e-Business

Chapter 2 provides a general survey of the concepts and perspectives around the evolution of BPR for e-business. The first part of the chapter presents the key issues around BPR by examining what we learned from the first wave of BPR in the early to mid-1990s. The second part of the chapter presents the issues around the evolution of BPR in its second wave in the late 1990s in order to better understand the direction of evolution of BPR for e-business. The structure of the chapter is in a question-and-answer mode to allow the reader to flexibly navigate through it and also to refer back for reference.

Chapter 3: Principles and Tactics of Process Redesign for e-Business

Chapter 3 provides three different sets of principles and tactics for redesigning enterprise processes in e-business situations: principles and tactics for restructuring and reconfiguring a business process (restructuring it), principles and tactics for changing the information flows around a business process (informating it), and principles and tactics heuristics for changing knowledge management around a business process (minding it). The principles and tactics are illustrated through many current examples.

Part B consists of five chapters that progressively go through the phases of business process redesign for enterprise processes and supply chain processes in the context of e-business.

Chapter 4: Scoping an Enterprise Process

Chapter 4 explains through a detailed real case study what needs to happen at the front end of enterprise process redesign (the scoping phase). It provides steps, methods, and templates.

Chapter 5: Foundations of Business Process Modeling and Analysis with BPR Software

Chapter 5 is the process modeling chapter. It provides the foundations of business process modeling and analysis with BPR software. It explains what BPR software is and provides a hands-on initial familiarization with the Holosofx **Workflow·BPR** software that comes with the book. This is done by working through a case example using the software. Finally, it provides guidance for readers who want to further ramp up their modeling skills.

Chapter 6: Analysis and Redesign of an Enterprise Process

Chapter 6 explains through a detailed case example the different methods of process analysis and redesign for enterprise processes while taking advantage of the **Workflow·BPR** software capabilities. It explains the steps in the modeling, analysis, and redesign phase. It shows how to compare “as-is” and “to-be” process designs through weighted average analysis and what-if simulation scenarios.

Chapter 7: Designing Collaborative Supply Chain Processes for e-Business

Chapter 7 takes the business process redesign methodology beyond the enterprise level to the supply chain level. Through a real case example, it shows how to redesign supply chain processes for e-business when there are multiple partners doing business with each other.

Chapter 8: IT Integration Options for e-Business Processes

Chapter 8 briefly describes the different types of IT software platforms that can be used to integrate new or redesigned e-business processes into enterprise architectures so they can be executed. The examination and consideration of these alternatives is the final step before launching organizational implementation. The chapter also reiterates how the focus of Part B of the book fits into the broader perspective of organizational transformation for e-business.

UNDERSTANDING BPR FOR e-BUSINESS

Part A of the book provides a general understanding of the concepts and issues of business process redesign (BPR) in the context of e-business. It provides an introduction to BPR and e-business, as well as a general survey of the concepts and perspectives around the evolution of BPR for e-business. It also provides principles and tactics for re-designing enterprise processes in e-business situations.

INTRODUCTION TO BPR FOR e-BUSINESS

- 1-1: INTRODUCTION
 - 1-1-1: What is BPR?
 - 1-1-2: What is BPR for e-Business?
- 1-2: THE CONTEXT OF BPR FOR e-BUSINESS
 - 1-2-1: The Leavitt Diamond: Understanding Organizational Adaptation
 - 1-2-2: The Evolution of BPR
- 1-3: HOW DOES A BPR PROJECT WORK?
 - 1-3-1: The Phases of BPR “in-the-BIG”
 - 1-3-2: The Participants in a BPR Project
 - 1-3-3: Cross-Enterprise BPR for e-Business
- 1-4: THE PROCESS REDESIGN PHASE OF BPR: A DESIGN FOCUS
- 1-5: REDESIGNING BUSINESS PROCESSES
 - 1-5-1: The Properties of Business Processes
 - 1-5-2: Three Generic IT-Enabled Ways for Redesigning Business Processes
- 1-6: THE LEARNING BLOCKS OF BPR FOR e-BUSINESS

WHAT CHAPTER 1 IS ABOUT

The chapter starts by introducing BPR and e-business and their relationship to how business enterprises go through organizational change. It outlines the phases of a BPR project while focusing on the business process redesign phase in particular. The chapter then introduces the key properties of business processes and outlines three different types of redesign heuristics while illustrating the role of information

technologies with examples. The chapter ends with a reiteration of the learning blocks required for acquiring skills in BPR for e-business and describes how this book provides them.

1-1 : INTRODUCTION

Sometime in the late 1980s there was a wave of disenchantment with the return on investment in information technology (IT) in much of corporate America. Why had huge investments in IT throughout the 1980s not resulted in corresponding increases in productivity and performance improvement?

There were many explanations given. One set of explanations centered around faulty measurements. They claimed that productivity measurements were too narrowly defined and were flawed when applied to a service economy. They also claimed that the effects of IT on performance improvement were lagging and would take many more years to show up at the aggregate level. A second set of explanations blamed IT itself and how it was being implemented; the culprits included user-unfriendly software, technophobic managers who did not understand IT, technocentric information systems professionals who did not understand business, and faulty IT implementation. A third set of explanations, however, provided a startling (but obvious) revelation: Perhaps it was not that information systems were not user-friendly but rather that organizational processes, structures, and designs were not “work-friendly”! It was not possible to take advantage of IT to improve business performance with rigid hierarchical structures and complex procedures designed for the functionally oriented command-and-control corporate environments of the 1960s. Those antiquated organizational designs had become a drag and often a complex mess. In fact, information systems were making things worse by cementing-in complex structures through automation. We were automating the mess.

The pressure for faster cycle times, cost cutting, and better customer responsiveness intensified with accelerating global competition in the late 1980s. There was a crying need to find new ways of doing business that would yield quantum leaps in performance. *That could only be done by both radically rethinking how to do business and by taking advantage of the capabilities of IT.* The fire of business process reengineering had been ignited.

In 1990 two articles that emanated from the practices of the Index Consulting Group (now part of Computer Sciences Corporation) appeared simultaneously: one by Thomas Davenport and James Short in the *Sloan Management Review*; a second by Michael Hammer in the *Harvard Business Review*. Both brought into focus the importance of business processes and explained how IT could innovate and radically transform business processes. The Davenport and Short article brought to light the recursive relationship between IT and business process redesign. Not only could information technologies support business processes, they could also be used to transform those processes and enable new ones. Thus the real power of IT was its capability to enable us to carry out things in ways that were never before possible. Davenport and Short called it the new industrial engineering and process innovation. The Hammer article made the same argument from a much more radical perspective: “*Obliterate, don't automate*” was

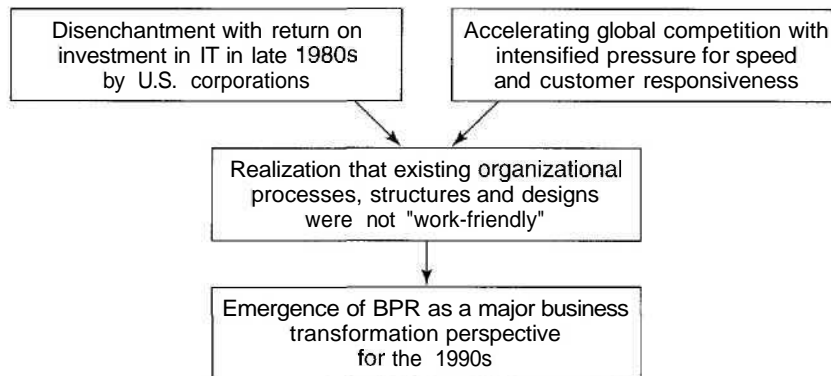


FIGURE 1-1 The historical triggers of BPR

Hammer's message. Blow up your old processes, throw away your old rules, start with a clean slate, and then use IT to radically change the way business processes are carried out. Hammer called it business process reengineering (BPR) and it started to gain popularity as a fresh business transformation perspective.

By 1993 the appeal of BPR had started to spread widely. That year, Michael Hammer and James Champy published a book on BPR titled *Reengineering the Corporation: A Manifesto for Business Revolution*. It hit a nerve with managers all over the world; in the few years that followed over 2 million copies of the book were sold in 17 different languages. The message of that well-timed book appeared to please managers and many began to perceive BPR as the possible savior and remedy for the performance ills of large corporations. The book made them feel good about themselves: It was those antiquated processes and functional structures and complex rules that were the culprits, not those hardworking flexible managers and professionals. The folksy style of the Hammer and Champy book made understanding how to use information technologies for business transformation easy to grasp by managers. Information technologies seemed easier to take advantage of than they had previously believed. The message hit home, and BPR was on a rampant path to becoming an official acronym and overused management buzzword. The hype around BPR subsided about three years later and in the late 1990s became a healthy balanced business practice.

1-1-1: What Is BPR?

The selling of BPR that emerged around the time of the Hammer and Champy book was accompanied by new armies of management consultants. At this writing, almost every major management consulting company has a BPR practice. Furthermore, many IT vendors have grown their own BPR practice divisions, as have companies in the systems integration business. They too have realized that the redesign of business processes is intimately linked to the technologies they are selling. With this blossoming of BPR consultants and accompanying hype, BPR has evolved into a practice with many variants and flavors. Common to all these variants, however, is a focus on redesigning business processes.

Business Process Reengineering (BPR) is in essence a performance improvement philosophy that aims to achieve quantum improvements by primarily rethinking and redesigning the way that business processes are carried out.

The above definition of BPR does not tell the whole story behind this performance improvement philosophy, which can be better understood by examining the implicit assumptions surrounding the B, the P and the R in BPR.

The P in BPR *A primary focus on essential processes that deliver outcomes is the signature of all variants of BPR* rather than a focus on static organizational structures. The BPR perspective looks primarily at flows that move, rather than at organizational structures that sit. It cuts across departmental boundaries and is thus typically cross-functional in scope within an enterprise. It can also cut across different enterprises when a business process is partly executed by one enterprise and partly by another as together they deliver an outcome.

The B in BPR The focus in BPR is on end-to-end business processes that extend all the way to a customer who receives some value from the process. The customer can be external or internal to the organization. *The BPR perspective defines the boundaries of a process in a way that makes sense in terms of business value: the coordination of ensembles of tasks performed by many people rather than narrow tasks performed by one person.* The B in BPR brings with it the primacy of effective activity coordination over individual task efficiency. This is what ultimately creates value for a customer, BPR is an outside-in perspective that defines a business process through the eyes of the customer of that process.

The R in BPR The R in BPR carries several implicit assumptions about the extent of performance improvement due to reengineering and how the reengineering is carried out.

First, *BPR searches for quantum improvements rather than incremental ones* (even though that may not always be possible.) This mindset encourages people to find innovative out-of-the-box solutions rather than just improving efficiencies through minor streamlining. To illustrate, there is usually enough "fat" in a process that a 10 percent reduction in cycle time can be achieved without any major structural change. However, a 90 percent reduction in cycle time will probably need a more creative solution. That does not mean we have to obliterate the existing process and start from a clean slate, nor does it mean we will not value incremental improvements in process performance. It does mean that we will constantly be looking for opportunities for quantum improvements in process performance.

A second assumption that comes with the R is that *any BPR effort will try to use IT to enable the process to be done in new ways that are qualitatively different.* IT is very good at changing the rules of space, time, and boundaries. Thus it is quite likely (but not necessary) that quantum performance changes will be enabled through the innovative use of IT. It is also quite likely that IT will be used for more than just automating an existing process.

A third assumption that comes with the R is that *there is a focus on maximizing the value-adding content of a process and minimizing everything else*. BPR aims to slash the non-value-adding parts of a process and enhance the value-adding parts.

A fourth assumption is that *the definition of value can have many forms that can be measured through surrogate performance measures* such as speed, cost, quality, learning, and return on investment.

Finally, a fifth assumption that comes with the R is that *the work environment (people skills, organizational design, organizational structure) will also have to be concurrently changed to fit the reengineered process*.

Taking these sets of assumptions into account gives a clearer picture of the commonality that underlies BPR in all its various approaches. Each approach differs in the way it emphasizes its favorite aspect. Some (like Hammer) tend to emphasize the importance of a clean slate approach. Others (such as system integrators) tend to emphasize the use of IT. Still others (such as organizational change specialists) have emphasized the people aspects. Despite the difference in relative emphasis, however, the above implicit assumptions are common to all of the variants.

1-1-2: What Is BPR for e-Business?

The Internet brings with it ubiquitous connectivity, real-time access, and a simple universal interface provided by Web browsers. Traditional enterprises are transforming themselves into e-businesses by reinventing the way they carry out their business processes to take full advantage of the capabilities of the Internet. The Internet allows an enterprise to communicate instantly with customers, suppliers, and partners. It changes the way information can move across enterprises, the way business transactions are carried out, and the way relationships are nurtured and maintained. These new conditions enable new ways of creating value that take advantage of the effects of real-time network connectivity.

BPR for e-business is more than Web-enabling. It involves redesigning enterprise processes across entire supply chains, whether they be front-office processes that interface with the customer (such as sales, marketing, and customer service) or back-office processes (such as order processing, inventory management, and manufacturing) or how back-office and front-office processes are connected together. When enterprises can exchange information easily in real time, work can be performed where it is done best across a supply chain. Furthermore, expertise and economies of scale can be exploited in new and different ways.

BPR for e-business involves rethinking and redesigning business processes at both the enterprise and supply chain level to take advantage of Internet connectivity and new ways of creating value.

It is important to note that e-business is much more than electronic commerce. E-business involves changing the way a traditional enterprise operates, the way its physical and electronic business processes are handled, and the way people work. BPR for e-business involves rethinking and redesigning business processes based on a new business model that transforms the entire supply chain and, consequently, the enterprises that comprise it.

Take, for example, the case of how a business customer buys personal computers through a supply chain that has taken advantage of the capabilities of the Internet. Ingram Micro, a distributor, and Solectron, a contract manufacturer, have reconfigured the supply chain and their roles in it. They have also come up with a system that will allow them to build computers to order, cut costs, and reduce cycle time substantially. A business customer places an order with a reseller through the Web and the order goes electronically to Ingram. The system analyzes the order and sends it via the Internet to the Ingram or Solectron factory most appropriate for the order. Ingram now has changed its role to an assembler, rather than just a distributor. Parts that are not in stock are automatically ordered from suppliers. The custom-built personal computers are built in the factories and shipped direct to the customers or to the resellers. The flow of information is continuous and the customer is kept updated throughout the process. Furthermore, the Ingram system provides the personal computer manufacturer (say Compaq) with information about the order and with customer information. Furthermore, Web-links between Solectron and the personal computer manufacturer allow easy collaboration on product design. Thus enterprise roles have changed; the order fulfillment, sales, and product development processes have been transformed; and information flows are dramatically changed. Business processes have been redesigned for e-business for the entire supply chain that comprises Ingram, Solectron, personal computer manufacturers, resellers, and business customers.

1-2: THE CONTEXT OF BPR FOR e-BUSINESS

BPR does not happen in a vacuum. BPR is carried out in an organizational context that has people, technologies, and organizational form and structure. Thus BPR occurs within the larger context of organizational change. BPR is also carried out within the context of a process-centered approach to organizational change of which there are many flavors.

1-2-1: The Leavitt Diamond: Understanding Organizational Adaptation

In order for BPR to be successful it is not sufficient just to redesign business processes. The work environment around the business process may also need to be adjusted in order for the newly designed process to be executed effectively. As in any other organizational change effort, a variety of organizational elements must fit together in a balanced way. The Leavitt diamond shown in Figure 1-2 (the name is attributed to Harold J. Leavitt and to its diamond shape) is an intuitive conceptual framework that shows how we can think of the dynamics of this balance.

The Leavitt diamond shows four sets of organizational variables: information technology use, organizational form, requisite people skills, and business processes. When any one of those is changed, the other three need to be adjusted accordingly so that the diamond remains in functional harmony. If a new information technology is introduced into the organization, business processes may need to be changed in order to take advantage of the technology. The use of the new information technology and the newly designed process may require new people skills to match, and perhaps a new organiza-

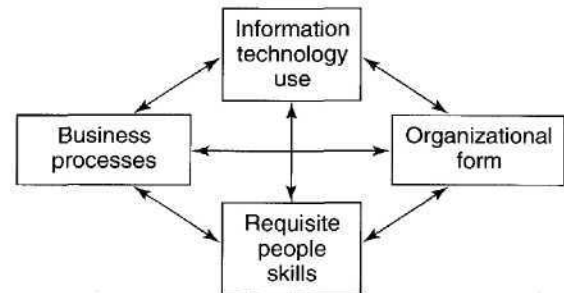


FIGURE 1-2 The Leavitt diamond: A conceptual framework for balancing IT-enabled transformation

tional form (more centralized, or team-based with a different reward system, for example). In an effective organizational change effort this mutual adaptation is planned ahead of time and managed so that the resultant balance of the Leavitt diamond is one that is conducive to effective organizational functioning. If not managed, some mutual adaptation will occur anyway and the Leavitt diamond may end up in a position that is dysfunctional. In a BPR effort, not only do the business processes need to be reengineered but also the information technology infrastructure, the skills needed by the people, and the organizational form may need to be redesigned as well. It is the balance of *all* these elements in a viable combination that is organizationally effective that makes for a successful organizational change, rather than changing any single one of them. They must work together well for BPR to be successful.

Different perspectives of organizational change and transformation have tended to emphasize one of the four sets of variables in the Leavitt diamond. The IT-driven perspective has emphasized the importance of integrated IT architecture for the enterprise. Organizational design perspectives have focused on finding new organizational forms. The human resource perspective has emphasized empowerment, reward systems, and training. The process-centered BPR perspectives have focused primarily on business processes. For any of these approaches to organizational change to be successful, they must take into account the other three sets of variables. The Leavitt diamond is a sobering framework that prevents us from going overboard on any one set of variables while neglecting the others.

1-2-2: The Evolution of BPR

The emphasis on processes as a focus for improving an organization's performance has gone through a number of phases in the last 20 years (see Figure 1-3). First, there was the Total Quality Management phase led by the Japanese, peaking in popularity in the early 1980s, that focused on continuous incremental improvement. Then came BPR in the early 1990s with its espoused radical "blow it all up" approach. By the mid-1990s first-wave BPR started to mellow, acknowledging that a combination of incremental and radical change was best. While BPR gained the most notoriety in the early 1990s, there were several other BPR-like business transformation movements taking place that also took advantage of the growing capabilities of information technologies. One of the

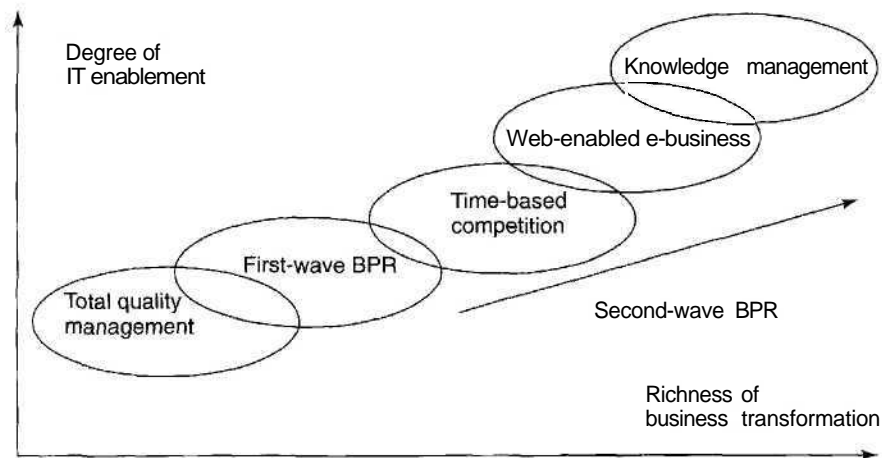


FIGURE 1-3 Waves of business process improvement

most potent of these approaches was time-based competition (or fast response management) in which business process redesign for faster cycle times, flexibility, and customer focus was linked directly to corporate strategy.

Then the Internet and the World Wide Web phenomenon took off in 1995 and eventually provided a ubiquitous IT internetworked infrastructure that enabled electronic commerce and new forms of Web-based business processes. Enterprises started to redesign their business processes to take advantage of the Internet all throughout the value chain from suppliers to distributors to resellers to end customers. This coming together of traditional physical value chains and electronic commerce became known as e-business in 1998. Business processes were redesigned across enterprises to take increasing advantage of the capabilities of the Internet. As we enter the year 2000, there is another concurrent approach to business process improvement taking shape based on more effective knowledge management around business processes. In knowledge-based business transformation, a large portion of the business process change is brought about by changing the knowledge-creating capability of the business process and its environment.

Together, all these business process improvement approaches are starting to combine into what could be called second-wave BPR. Second-wave BPR has richer dimensions than first-wave BPR. It is more closely linked to strategic dimensions; it is more focused on cross-enterprise e-business; it takes much greater advantage of capturing and creating new knowledge around business processes; and it takes greater advantage of the Internet. Table 1-1 compares the different waves of business process improvement. The mad scramble by enterprises to move quickly to e-business has caused this second wave of BPR to be Internet-centered. The use of the Web as an IT infrastructure has opened up many new opportunities for exchanging information and creating knowledge around supply chain processes that have triggered new ways of adding value and new business models. The centrality of BPR for increased enterprise and supply chain effectiveness has never been greater than it is now in this era of e-business. The best of BPR is yet to come as second-wave BPR takes shape.

TABLE 1-1 WAVES OF BUSINESS PROCESS IMPROVEMENT

	Total quality management	First-wave BPR	Second-wave BPR		
			Time-based Competition	Web-enabled e-business	Knowledge management
Signature of process change	Reduction of variability and defects in process outputs	Obliteration of old task-oriented processes and replacement with radically innovated business processes	Transformation of process flows and organization to be fast, focused, and flexible	Cross-enterprise internet processes with suppliers, customers, and partners	Expanding the knowledge creation capacity of business processes
Nature and magnitude of organizational change	Continuous incremental improvement	Espoused radical change — although often with incremental implementation	Cycle time used as a diagnostic for strategic organizational change	Collaborative business process redesign around cross-enterprise electronic interfaces	Knowledge change creates competencies for both improved and new processes
Associated Era	1980s	Early 1990s	1990s and beyond	Late 1990s and beyond	2000 and beyond
Role of IT	Minor role in data collection and analysis	Critical enabler of new ways of executing processes	Enabler of fast response	Web-based IT infrastructure enables new supply chain processes	Triggers the shaping and synthesis of new knowledge
Execution Approach	Bottom-up grass roots	Top down and mostly one-shot	Top down and comprehensive	Cross-Enterprise Partnering	Middle-Up-Down
Dysfunctional aspects or bad practices	Not necessarily strategic	Slash and burn downsizing	Not linking cycle time reduction to strategy	Few standardized partner interface processes	Confusing knowledge with information and data
Time frame of target focus	Continuing	Short-term performance focus	Long-term performance focus	Short-term and long-term performance focus	Long-term potential focus

1-3: HOW DOES A BPR PROJECT WORK?

BPR does not happen in an unstructured manner. It must be driven by a vision that has the support of top management; it must be planned and managed through a systematic methodology; and the organization must be mobilized for effectively carrying out both the design and the implementation. For BPR to be successful, it must be organized like a project that has assigned teams, targets, budgets, tools, milestones, and deadlines.

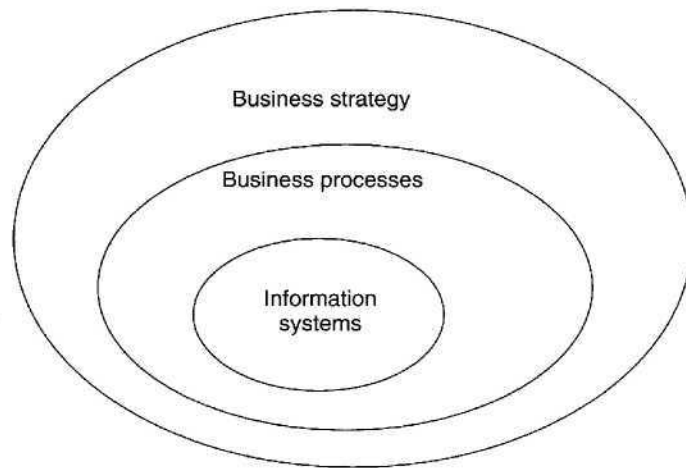


FIGURE 1-4 The design mindsets of BPR

While idealistically we like to believe that process management and improvement is a continuous activity that is part of a business professional's job, we are not at the stage where that has been systematized as part of management. For now, BPR is best carried out through a project structure.

A BPR project is a form of organizational change project that ideally brings together three design mindsets: business strategy, business processes, and information systems (see Figure 1-4). While the bulk of the exposition in this book focuses on the reengineering of business processes, this does not mean that the link to corporate strategy and the implementation of related information systems is any less important. The three perspectives are linked together in practice.

1-3-1: The Phases of BPR "in the BIG"

For purposes of explanation, we distinguish between the larger BPR project that includes design, implementation, and maintenance from the design portion of it (which is the focus of this book) by naming the larger project "BPR in-the-BIG." There are a variety of descriptions of how BPR can be systematically carried out in practice and what the phases of a BPR project are. Drawing on the publicly available literature and from the practices of several consulting companies with prominent BPR practices, this book has come up with a five-phase approach to BPR in-the-BIG as shown in Figure 1-5.

Phase 1: A BPR project starts with some sort of trigger such as a performance problem, a competitive e-business move, or pressure from a supply chain partner. It can also be driven primarily by a value creation opportunity or an executive vision of how a particular aspect of the company (say customer service) should be. Deliberations and discussions take place and proposals are made. Then top management gives the go-ahead.

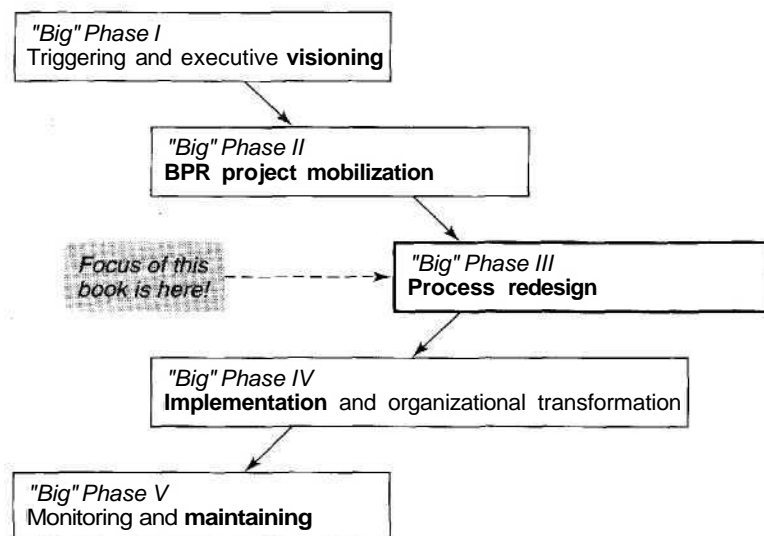


FIGURE 1-5 The 5 typical phases of BPR in-the-BIG

Phase 2: BPR mobilization occurs by selecting a project leader and forming a core BPR team. The processes to be redesigned are selected and a preliminary assessment of IT infrastructure around those processes is made. A BPR plan and budget is proposed.

Phase 3: In this phase the business process is redesigned and performance comparisons are made, sometimes through benchmarking with other companies. The process design is also readied for implementation. Part B of the book (Chapters 4 through 8) will explain this phase in detail.

Phase 4: The implementation and organizational transformation stage is the toughest phase to execute. It includes designing the information systems and modifying the IT infrastructure. It also involves introducing and instituting the new process with its accompanying organizational design changes, training people (sometimes firing them) and possibly reskilling them, and dealing with the political and human problems that occur whenever a large organizational change is made.

Phase 5: Ideally BPR is not a one-shot effort and the process needs to be monitored on a continuous basis so that the process can be maintained and modified when conditions require.

1-3-2: The Participants in a BPR Project

There are a variety of participants in a BPR project as shown in Figure 1-6. At the heart of a BPR project is the core BPR team that must manage the project and coordinate the different participants. The team includes a project leader.

A BPR project will only be successful if it has top management (and a budget) behind it. Any BPR project needs executive sponsors who are often champions for the project. Another important set of participants is the process owners. A process owner is

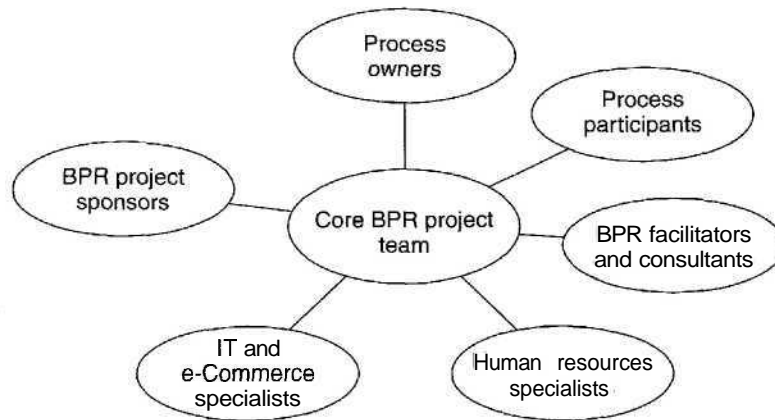


FIGURE 1-6 Typical participants in a BPR project

someone who has responsibility and accountability for a business process. It is pointless to reengineer a business process if the process owners are not involved and engaged in the project.

Many BPR projects bring in BPR facilitators and consultants from outside the organization who bring BPR expertise, whether in the design or implementation or institutionalization aspects of BPR. Then there are participants needed in order to change the work environment around the process. These include human resource specialists who are needed to redesign jobs and reward systems and information systems specialists and electronic commerce specialists who are needed to change the IT infrastructure around the process and to design the information systems.

1-3-3: Cross-Enterprise BPR for e-Business

An e-business BPR project for a business process that is carried out across a supply chain in more than one enterprise is trickier and more complex than if it were inside the same enterprise. First, there has to be agreement on how the interface between the parts of the process in each of the enterprises is designed and what information is passed between the enterprises. Some industries, such as the IT industry, are forming industry consortia in order to have standardized common electronic business interfaces that allow them to carry out e-business seamlessly across the supply chain. In the absence of business standards, however, the partnering enterprises have to agree on what the technical and process characteristics of the interface are and adapt their enterprise processes to the interface. Second, the political and organizational challenges of getting more than one enterprise to collaborate on a joint BPR project are much more demanding and difficult to manage. Third, the underlying IT infrastructures and enterprise information systems are often incompatible, further complicating the BPR effort. However, it is the cross-enterprise BPR projects that have the highest potential impacts on business effectiveness.

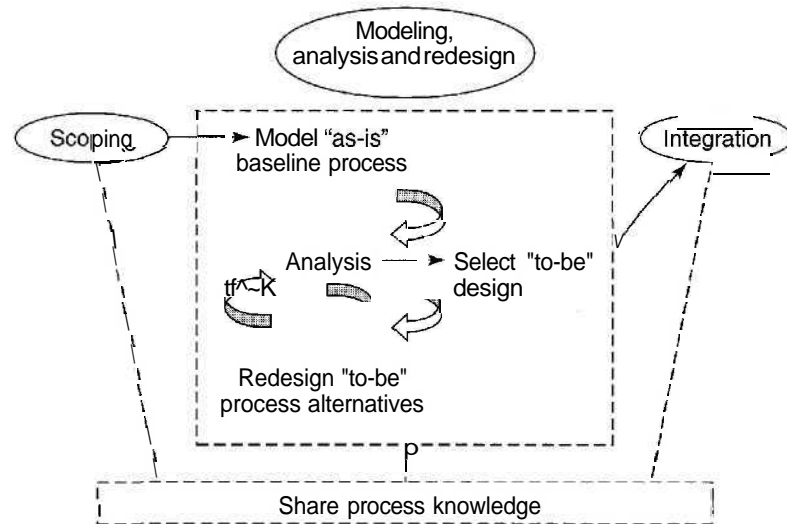


FIGURE 1-7 Phases of business process redesign when BPR software is used

1-4: THE PROCESS REDESIGN PHASE OF BPR: A DESIGN FOCUS

The Process Redesign phase, Phase 3 of BPR in-the-BIG, is the focus of this book. The phases and steps in the process redesign phase are shown in Figure 1-7 and Table 1-2. They are explained in detail in the rest of the book and no attempt will be made here to describe each of the three phases beyond identifying them and outlining the steps. The process redesign phase requires a mindset from participants that is both probing and diagnosing while making visioning leaps and discovery. Participants need to select tools and technologies to help them through this phase of the process as well as form productive teams.

Note that, unlike some other process reengineering methodologies, we have devised a set of steps that take advantage of BPR software. Thus the process redesign phase has itself been reengineered in this book in order to take advantage of BPR software. BPR software allows us to do more analysis and consider more redesign alternatives than we can without it. It also enables us to easily prepare the design for integration into information systems or workflow software.

1-5: REDESIGNING BUSINESS PROCESSES

Business processes are redesigned by changing the topology of flows associated with them, whether these flows be physical products, information, or knowledge. Three generic ways for redesigning a business process are: restructuring and reconfiguring the process (restructuring the process); changing the information flows around the process (informatizing the process); and changing knowledge management around the process (minding the process). These redesign methods and their associated principles and tactics are examined in detail in Chapter 3. Although the three generic ways are not mutually exclusive and

TABLE 1-2 KEY PHASES & ACTIVITIES IN BUSINESS PROCESS REDESIGN WITH BPR SOFTWARE

Phase 1 Scoping the Process	Phase 2 Modeling, Analysis, & Redesign of Process	Phase 3 Planning Process Integration
Activities	Activities	Activities
<ul style="list-style-type: none"> • Operationalize process performance targets • Define process boundaries ➤ Identify key process issues • Understand best practices and define initial visions ➤ Familiarize participants with BPR software • Outline data collection plan and collect baseline data • Plan for modeling phase 	<ul style="list-style-type: none"> • Continue data collection • Model "As-Is" baseline process • Analyze and diagnose "As-Is" process • Design and model "To-Be" process alternatives • Analyze "To-Be" process alternatives and select best alternative • Plan process integration phase 	<ul style="list-style-type: none"> • Examine alternative IT integration options • Adjust process design • Plan for process implementation
Deliverables	Deliverables	Deliverables
<ul style="list-style-type: none"> • Process Scoping Report 	<ul style="list-style-type: none"> • Software-Based Process Model • Process Reengineering Report 	<ul style="list-style-type: none"> • Process Integration Plan
Key Participants	Key Participants	Key Participants
<ul style="list-style-type: none"> • Process Owners and Partners • Customers of Process • BPR Team 	<ul style="list-style-type: none"> • Process Participants • BPR Team 	<ul style="list-style-type: none"> • IS Design Team • BPR Team

there is overlap among them, it is useful to separate them for purposes of illustration. This section provides some simple examples to give readers a general sense of how processes can be redesigned and the role information technologies can play. Some key properties of business processes are first outlined.

1-5-1: The Properties of Business Processes

A business process is a coordinated and logically sequenced set of work activities and associated resources that produce something of value to a customer.

A business process typically has the following properties:

- **Customer-facing:** A business process must provide some value to a recipient (person, organization, process) that is viewed as the customer of that process. The outputs of

a process can be used by either external customers or internal customers. External customers are the people or entities outside the organization that purchase products or receive services from the organization. Internal customers are employees inside the organization who add more value to the product or service on its way to a final customer. Customers can also do some of the work in a business process when self-service techniques are used.

- **Cross-functional, cross-departmental, and cross-enterprise:** A business process is typically cross-functional and cuts across many different departments. For example, a sales process can constitute several subprocesses such as customer contact, order fulfillment, shipping, invoicing, and collection, each of which could be performed by one or more organizational units. A business process also is not confined to one part of the functional hierarchy of an organization (sales, R&D, engineering, manufacturing) but cuts horizontally across them. It is often carried out by more than one enterprise and includes much interenterprise communications.

- **Hand-offs:** Hand-offs occur when a completed task is handed off to another person to carry out the next task in a sequence. Hand-offs are a key element of a business process and are the vehicles of coordination between different tasks. They are also the cause of errors and delays and difficult to manage. The effective management of hand-offs is critical for effective redesign of a process. Management of coordination rather than improved efficiency of tasks makes for much improved process performance.

- **Information flow around the process:** This is the information flow needed to produce the outputs of the process and also the information necessary to monitor the process. Altering the dynamics of information flows is one way of redesigning business processes.

- **Knowledge created around the process:** This includes the collective requisite knowledge about the process that the participants have that enables them to execute the process effectively under various conditions. This also includes knowledge about the process (trends, new exceptions, frequently asked questions, improvement ideas) that can be synthesized over time by gathering information from those who interact with the process (employees, customers, suppliers). Expanding the knowledge-creating capacity of a process is another way of redesigning a process through enabling the process to learn and become a source of "smarts" for its participants.

- **Multiple versions rather than one-size-fits all:** A business process has multiple versions (also called cases), each of which is performed based on particular conditions (triggers, type of customers). Furthermore, each of these versions is executed many times. For readers who are familiar with set theory, this means that a business process is a class rather than an instance.

- **Value-adding mix of a process:** A business process is made up of value-adding work (directly adds value for the customer), non-value-adding work (enables value-adding but does not add it directly, such as management processes, accounting, for example), and waste (which neither adds nor enables value). While it is clear that waste is undesirable, the balance between the other two elements of the mix (value-adding and non-value-adding) is trickier. It is a design parameter to be consciously considered that trades off the cost and value of management control.

- **Degree of structure of a process:** Some types of business processes are highly structured in that the process follows a series of "well-defined predetermined steps every

time the process is enacted (an order entry process is an example). Other business processes have much more fluidity and cannot be tightly determined in advance (a new product development process is an example). Business processes that include intensive knowledge work are typically more difficult to tightly structure than businesses processes that consist of mainly clerical or production work. Redesign tactics will differ depending on the degree of structure of a process.

While processes have other properties, the ones listed above are adequate at this point to help us appreciate the three examples below and continue through the progression of the book. Other properties will be introduced as needed along the way.

1-5-2: Three Generic IT-Enabled Ways for Redesigning Business Processes

Each of the three generic types of process redesign heuristics is illustrated through a case example below. In each of the examples, information technologies enable new ways of carrying out the process.

Example #1: Restructuring and Reconfiguring Processes (Restructure It)

L.L. Bean is the largest mail order catalog company for outdoor camping gear and sporting apparel in the U.S.A. In 1996 its revenues were \$1.2 billion and it sold 16,000 different items from 24 separate catalogs. L.L. Bean employed 3,100 customer service representatives who took 80 percent of the company's orders over the phone; the balance of the orders was received through mail, fax, and some through L.L. Bean's Internet Web site. The yearly call volume was 14 million phone calls and averaged about 50,000 phone calls a day. They shipped 12 million packages for the year with as many as 150,000 orders arriving per day in peak season.

In 1994 L.L. Bean decided to redesign their order fulfillment process. It was becoming much too slow and inflexible for their growing volume and product line complexity, global expansion (\$210 million in international orders from 150 different countries), and growing customization (monogramming, custom tailoring, special embroidering). The project involved many teams of employees who worked together to reinvent the process and also to benchmark the process with companies that were leaders in the order fulfillment area. Basically, they took the old process apart and put it back together in a new way. They restructured it and at the same time changed the infrastructural environment around the process.

The old order fulfillment process was a batch process. Orders coming into L.L. Bean through telephone were entered into the computer. Every 12 hours the computer sent the orders to the order fulfillment center. The order fulfillment center is a huge warehouse where pickers fill the orders. They pulled carts, going from bin to bin, until they assembled an entire order for one customer. They then would stow each order in one of 25 slots in the cart. When pickers had assembled 25 orders, they would deliver them to packers who would pack each order for shipping. It was a slow, cumbersome process that perhaps provided good physical exercise for the pickers as they moved from area to area of the warehouse, but otherwise quite inefficient.

The new order fulfillment process was changed from a batch process. Now when an order is received, it is no longer held for 12 hours. Instead the computer sends it directly to the order fulfillment center. In the new process each order is broken up into its component parts through the use of new information technologies. Each component is assigned to a different picker who is assigned to a particular physical area of the warehouse. Thus one customer order made up of four items (a pair of hiking boots, a fishing rod, a camping lantern, and a sweater) could be assigned to four different pickers. Each picker places the picked item on the conveyor belt. The conveyor belt has electronic sensors that read bar codes and automatically sort orders and direct items to packing stations where they come together and are packed for shipping by Federal Express. This new process is faster: L.L. Bean can turn around 100 percent of its orders within 24 hours, compared to as long as two weeks several years ago. The picking part of the process has been restructured from a serial batch process into a continuous parallel process that is coordinated with the help of information technologies. The information technology—the hardware and software used for bar coding, sorting, picking, moving, sensing, packing, and shipping the items for an order—has enabled a new restructured process to be possible and effective. L.L. Bean compares the process to going from individual swimming in a relay race to synchronized swimming.

Let us not forget the Lcavitt diamond framework in Section 1-2-1. At L.L. Bean it was not only the flow of the process that was redesigned and changed but also the environment around the order fulfillment process. The information technology infrastructure clearly changed. Furthermore, there is a new order fulfillment center that is a larger warehouse (650,000 square feet) with 25 shipping docks, 3.5 miles of conveyor belts, and a built-in Federal Express operation on site. The way that resources are assigned also changed. Now when an order comes in, team leaders are able to track the level of activity of pickers through their computer screens and can quickly decide which pickers are able to more appropriately handle the incoming order. This allows more flexibility and dynamic reallocation, further speeding up the process. The change requires new skills from both the team leaders and the pickers. It also meant changing the collaborative team structure of the organization. In short, both the process structure and its environment were changed in this BPR effort.

Example #2: Changing Information Flows around Processes (Informate It)

Similar in revenue size to L.L. Bean, Marshall Industries is a \$1.2 billion distributor of industrial electronic components and production supplies in the U.S.A. Marshall distributes 125,000 different products manufactured by over 100 major suppliers in the U.S.A. and Japan to over 30,000 business customers. It has a network of 38 sales and distribution branches and three corporate support and distribution centers in North America. It also has a sizeable investment in SEI, one of the largest electronics distribution companies in Europe. Over 75 percent of Marshall Industries' sales are from semiconductor products, which include passive components, connectors, computer peripherals, instrumentation, and industrial production supplies.

In the 1990s the landscape around their distribution business started changing rapidly. Large customers were globalizing their business processes and requiring global

sourcing of electronic components. Time-based competition and time-to-market were compressing product life cycles to unprecedented levels (some as short as three months) requiring much faster response from distributors. It became crucial to share information rapidly along supply chains and to develop effective coordination. Concurrently, the power of new information technology networks with distributed architectures, bandwidth proliferation, and increasing user friendliness were providing new opportunities for conducting operations in the distribution business. Marshall Industries realized that there was both a need and an opportunity to redesign their business processes by changing the information flows around them and taking advantage of new information technologies.

Marshall realigned their organizational design so that they could redesign their business processes for this new business environment. In terms of the business processes themselves, the redesign thrust was driven by changing the information flows around them through the use of Internet technologies and the World Wide Web. Marshall redesigned the supply chain processes mainly through informing them differently. Yes, of course restructuring of the processes also occurred to take advantage of the new information flows, but that was secondary.

For example, Marshall redesigned its sales and marketing process to be an end-to-end closed loop system with intensive information flows through the use of Internet technologies. Their intranet (an internal Web-enabled information system accessible through Internet browser software) supports 400 field sales employees equipped with laptop computers who travel to customer sites. It enables them in real time to check inventory and product specification datasheets, quote orders, communicate with other employees, collaborate on projects, and make presentations. A key feature of the intranet that informs the sales and marketing process is what they call a marketing encyclopedia. It consists of 2,500 different documents, containing details about suppliers and product lines. Field salespeople can prepare and make presentations to customers on the fly and customize them to the needs of both engineering customers and corporate buyers. Furthermore, if the customer is interested in buying products from more than one supplier at the same time, the field sales employee can seamlessly integrate presentations from different suppliers. The marketing encyclopedia also informs salespeople about key programs, new products, and advertising campaign details. The sales and marketing process is intensively informed in near-real time, and thus becomes much more iterative, faster, and more effective. The process is still mediated by salespeople and occurs in the physical premises of the customers' offices, but informing it differently results in a very different process.

The sales and marketing process was further redesigned by linking it more directly into the order fulfillment process in a self-service mode. Marshall Industries has made its product information available directly through its Internet site, which gets about 1 million hits per week from 60 different countries. The Internet channel provides another sales and marketing route that further informs the sales and marketing process. The Web site contains information about 170,000 part numbers and real-time inventory pricing from over 100 suppliers. It also contains product advertisements from different suppliers. The site allows customers to request samples,

order products, and track their orders online. Besides offering customers valuable product information, the site provides electronic industry news using streaming audio broadcasts. The sales and marketing process has multiplied its routes and links to other business processes in the supply chain by redesigning the information flows and informing the process differently.

Example #3: Changing Knowledge Management around Processes (Mind It)

Storage Dimensions is a \$70 million manufacturer of non-stop disk and tape storage systems for client-server network environments in Milpitas, California. Its computer storage solutions are targeted to organizations with enterprise-wide client-server networks that must keep mission-critical data protected and available 24 hours a day. Their customers are large companies in information-intensive industries that live and die by their data such as airlines, financial services, and retail stores. It is imperative that they respond to their customers' technical problems at lightning speed. This is complicated by the fact that their storage products operate in multivendor network environments where new compatibility issues are generated whenever any of the hardware or software products in the network change to a newer version—and product innovations occur at amazing speeds. As an example, Intel Corporation releases new models of microprocessor chips used in network servers every 90 days. Thus compatibility issues and related technical problems at customer sites are generated for Storage Dimensions every 90 days.

Following a buyout from Maxtor, company management refocused Storage Dimensions to become a higher-end and faster-response industry player. It was clear that exceptional customer support would be essential to success, and a customer support-focused corporate strategy was put in place. When the customer support process was reexamined, it was apparent that it was becoming inadequate for the growing customer base and expanding product line. Furthermore, with increased globalization customers were dispersed geographically and in different time zones. The customer support process was too slow (as much as 2-3 hours to return a phone call in some circumstances), too haphazard (no organized online knowledge base for repeat problem solutions), too expensive (repeat problems frequently escalated to development engineers, long training periods) and stressful to both support personnel (overloaded) and managers (little visibility for the what, who, why, when). Top management saw the need for a radical solution.

Storage Dimensions set out to reengineer its customer support process so that they could respond faster in such a breakneck environment. Their biggest payoff in redesigning the process came from an interactive information system with knowledge capture and synthesis capabilities used in conjunction with their help desk. TechConnect, as their system is called, augmented rapid problem resolution by helping to capture new knowledge on the fly through structured customer dialogues without lag time between discovery of a problem and its solution and availability to all in an intelligently accessible form. It expanded the knowledge-creating capacity of the customer support process.

The TechConnect system is based on a knowledge-base architecture that adaptively learns through interactions with users. The unique software-based problem resolution architecture links problems, symptoms, and solutions in a document database. All problems or issues are analyzed through incident reports, and resolutions are fed back into the online knowledge base in the form of solution documents. The way that the TechConnect knowledge base learns is through the very well-structured dynamic feedback loops that are managed by the problem resolution architecture. As problems are analyzed and resolved by technical support specialists, development engineers, and customers, results are integrated into the knowledge base as solution documents and new knowledge is created and synthesized. As a result, solutions are consistent and readily available to support specialists and customers alike. Solutions are fresh (up-to-date), accurate, and based on the latest experience of customers (200 new data points per week). At this writing, support specialists and customers had access to information from over 35,000 relevant incidents. In total, 1,700 solution documents were available electronically. Because 80 percent of incoming calls are repeat problems, existing solution documents often provide resolutions within minutes. Another key feature of the TechConnect system is the Bubble-Up solution management technology that enables the TechConnect knowledge base to adaptively learn through its interaction with users. It automatically prioritizes solution documents based on "usefulness-frequency of use" in resolving specific problems; the higher priority ones rise to the top of the list. This helps less experienced inquirers to see the most useful solutions and speeds up problem resolution. The Bubble-Up process also adaptively changes the structure of the knowledge base and adapts it continuously to new knowledge.

The TechConnect system in effect changed knowledge management around the customer support process by creating a near-real-time knowledge base that took advantage of the knowledge of all customers, other vendors, and support staff. This enabled the customer support staff participating in the process to learn more quickly and consequently to experience faster problem resolution. The customer support process was creating new knowledge and learning at a much faster rate while at the same time capturing and organizing this knowledge from all who interacted with it. In effect, the customer support process is smarter and more "learningful" and has a "mind" of its own through the use of TechConnect. Furthermore, the way that a customer call is handled has changed. There is no need to escalate the call quickly to the person with the greatest expertise. With the help of the TechConnect system, the less experienced technical support people can be much more effective. The customer support process was redesigned primarily through the TechConnect system that changed the way knowledge was managed around the customer support process.

The three examples are meant to give the reader a basic understanding of different process redesign heuristics and the role of information technologies in enabling and shaping new ways of working. The order of the three examples should help the reader realize that in BPR for e-business, it becomes increasingly the case that business process redesign will occur through changes in information (flows and changes in

knowledge management around a process. A more detailed examination of principles and tactics is the topic of Chapter 3.

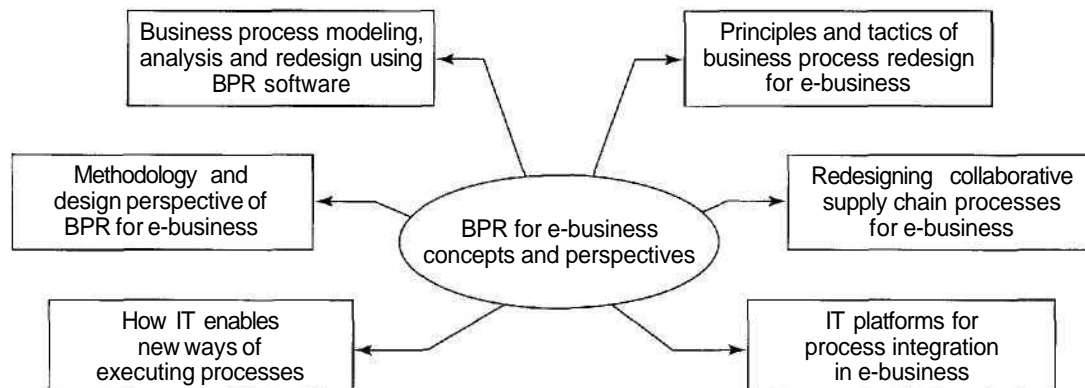
1-6: THE LEARNING BLOCKS OF BPR FOR e-BUSINESS

Whether you are a practicing business professional or in an MBA program anywhere in the world, BPR for e-business is a core skill you will need to master. Sooner or later, you will be asked to improve, transform, and redesign the business processes that you are part of in your enterprise. Whether you are in a traditional enterprise or a new start-up, there is a big push toward transforming business processes for e-business that will require BPR skills. First, you will need to understand the "why" of BPR for e-business—its drivers and motives. Second, you will need to understand the "what" of BPR for e-business—its concepts, approaches, components, and dynamics. Third, you will need to understand the "how" of BPR—the steps, methodologies, and tools necessary for carrying out a BPR effort. You will not only need to understand these aspects at the enterprise level but also at the cross-enterprise supply chain level.

What will this book help you learn and understand? This book is designed to help you understand concepts and approaches and learn methodological skills through current case examples and the hands-on use of software. Specifically, this book will provide you with the following:

- General understanding of the underlying concepts, perspectives, and evolution of BPR for e-business from both a design and implementation perspective.
- In-depth understanding of the *design perspective* of BPR for e-business and accompanying methodology.
- A skill for process modeling, analysis, and redesign using BPR software and a hands-on familiarity with how BPR software works.
- Key principles and tactics of redesigning business processes for e-business. These include principles and tactics for changing the configuration and structure of processes,

FIGURE 1-8 The scope of the book



changing information flows around processes, and effective knowledge management around processes

- An understanding of how IT can be used to enable new ways of executing business processes.
 - An understanding of leading-edge methods to redesign collaborative supply chain processes for e-business.
 - An appreciation of options for IT platforms for process integration in e-business.
-

KEY ISSUES AROUND BPR AND THE EVOLUTION OF BPR FOR e-BUSINESS

2-0: FIRST AND SECOND WAVES OF BPR

2-1: KEY ISSUES AROUND BPR: WHAT WE LEARNED FROM THE FIRST WAVE

- 2-1-1: The Scope, Success, and State of BPR
- 2-1-2: BPR Methodologies and Information Technologies
- 2-1-3: People Issues in BPR

2-2: BPR FOR e-BUSINESS: WHERE THE SECOND WAVE IS TAKING US

- 2-2-1: BPR and Supply Chain Management
- 2-2-2: BPR and Knowledge Management
- 2-2-3: BPR and Web-Enabled e-Business

WHAT CHAPTER 2 IS ABOUT

This chapter provides a general survey of the concepts and perspectives around the evolution of BPR for e-business. The first part of the chapter presents the key issues around BPR by examining what we learned from the first wave of BPR in the early to mid-1990s. The second part of the chapter presents the issues around the evolution of BPR in its second wave in the late 1990s in order to better understand the direction of evolution of BPR for e-business beyond 2000.

The structure of the chapter is a question-and-answer mode to allow the reader to flexibly navigate through it and refer back later for reference. Issues dealt with in later chapters in the context of process analysis and redesign are excluded from this chapter. After each set of questions, related references are suggested for readers who would like to find out more about each particular topic area. These sources are meant

to be illustrative and good starting points for the business professional, rather than an exhaustive list of sources. Suggestions are always welcome at the book's Web site.

2-0: FIRST AND SECOND WAVES OF BPR

In Chapter 1 (Section 1-2-2) we outlined the waves of process improvement and the evolution of BPR. We identified the first wave of BPR during the early to mid-1990s that focused on cost cutting and making enterprise processes lean and mean. We also

TABLE 2-1 WAVES OF BUSINESS PROCESS IMPROVEMENT

	Total quality management	First-wave BPR	Second-wave	BPR	
			Time-based competition	Web-enabled e-business	Knowledge management
Signature of process change	Reduction of variability and defects in process outputs	Obliteration of old task-oriented processes and replacement with radically innovated business processes	Transformation of process flows and organization to be fast, focused, and flexible	Cross-enterprise internet processes with suppliers, customers, and partners	Expanding the knowledge creation capacity of business processes
Nature and magnitude of organizational change	Continuous incremental improvement	Espoused radical change—although often with incremental implementation	Cycle time used as a diagnostic for strategic organizational change	Collaborative business process redesign around cross-enterprise electronic interfaces	Knowledge change creates competencies for both improved and new processes
Associated era	1980s	Early 1990s	1990s and beyond	Late 1990s and beyond	2000 and beyond
Role of IT	Minor role in data collection and analysis	Critical enabler of new ways of executing processes	Enabler of fast response	Web-based IT infrastructure enables new supply chain processes	Triggers the shaping and synthesis of new knowledge
Execution approach	Bottom-up grass roots	Top down and mostly one-shot	Top down and comprehensive	Cross-enterprise partnering	Middle-up-down
Dysfunctional aspects or bad practices	Not necessarily strategic	Slash and burn downsizing	Not linking cycle time reduction to strategy	Few standardized partner interface processes	Confusing knowledge with information and data
Time frame of target focus	Continuing	Short-term performance focus	Long-term performance focus	Short-term and long-term performance focus	Long-term potential focus

identified a composite, more strategic second wave of BPR that focused on redesigning supply chain processes for collaborative advantage and creating value as quickly as possible. The second wave of BPR began in the late 1990s. It was Internet-centered, taking increasing advantage of knowledge management around business processes, and driven by the scramble of enterprises to move to e-business as quickly as possible. Table 1-1 in Chapter 1 (repeated as Table 2-1) compares the characteristics of these two waves.

Section 2-1 expositis the key issues around BPR by examining what we learned from the first wave. Section 2-2 presents the issues around the evolution of BPR in its second wave in order to better understand the direction of evolution of BPR for e-business beyond 2000.

2-1 KEY ISSUES AROUND BPR: WHAT WE LEARNED FROM THE FIRST WAVE

2-1-1: The Scope, Success, and State of BPR

1. What Is the Typical Scope of a BPR Project? The scope of a BPR project can vary from small to very large:

- Reengineering a narrow process in a single area of a company (purchasing office supplies for a motorcycle factory).
- Reengineering an enterprise-wide core business process (such as new product development across all product lines).
- Reengineering a strategic supply chain management process that extends across several companies (such as co-sourcing of raw materials with fluctuating availability).
- Reengineering a common business process that affects the way business is done in an entire country (such as reengineering the shipping and customs clearance process for international trade in Singapore).

Furthermore, while the philosophy of BPR (see definition in Chapter 1) aims to achieve quantum improvements of large magnitude—thus implying radical changes—this aim often does not carry over when translated from design to implementation. Radical changes proposed at the design stage are often watered down when difficulties and challenges start to appear at the implementation stage. Thus projects ranging from streamlining processes for efficiency (how travel expenses are reimbursed) to reinventing new processes that transform entire industries (buying a car through the Internet) are labeled as BPR. In 1994, at the peak of its hyped popularity, there was a joke going around that any project that needed to be funded by top management was called a BPR project. Smaller and simpler BPR project out-of-pocket costs are typically in the tens of thousands of dollars, while larger efforts typically range in the tens of millions of dollars. When huge infrastructure and information technology investments are needed, the costs tend to go up very quickly. The Internal Revenue Service in the U.S.A. has a long-term BPR project that is reportedly in the \$20 billion range.

For large-scale enterprisewide BPR projects it is not uncommon for the process redesign phase to take about six months—perhaps preceded by another six months of visioning and project mobilization. Implementation and organizational transformation is

typically well underway in about one year, but there are phased enterprisewide BPR implementation projects that take as long as five years before full implementation. For example, a global telecommunications equipment vendor that does business in 120 countries and wants to reengineer its global order fulfillment process may phase the implementation over several years, for reasons of effort required and the sizeable infrastructure investments that implementation may entail. Smaller BPR projects that focus on a narrow process in one geographical location can typically be initiated and redesigned in weeks and organizationally implemented in months.

As our methodologies improve through the use of BPR software and advances in software allow us to design information systems very rapidly, we are seeing a decrease in the time needed for the implementation of BPR projects. Furthermore, the pressure of working and living on Internet time and the move to e-business are exerting further pressure for quicker BPR projects.

2. What Are the Most Common Reasons for Doing BPR? In the early 1990s, cost cutting and downsizing were prime drivers of BPR projects. BPR then was more often triggered by symptoms and manifestations that induced fear and pain such as the following:

- Broken processes that the competition was taking advantage of.
- Sagging profits due to price cutting by global competitors.
- Overhead costs that were growing faster than revenues.
- Faster and nimbler competitors with shorter product lifecycles.
- Stagnant business conditions that required targeting a new segment of the market.
- Unsatisfied customers who were leaving in droves.

BPR in this era had a negative slash and burn connotation and was closely associated with downsizing and layoffs. In the U.S.A., this also coincided with an economic recession. As the recession ended and companies were again poised for growth, cost cutting became less of a driver for BPR. Adding value for customers and creating new opportunities became the more important BPR drivers.

BPR can be very exciting when accompanied with bold visions of growth, speed, and competitiveness. New information technologies enable innovative new products and services delivered through reengineered processes: a loan application process requiring only one phone call and an approval in 15 minutes; a global new product development process where remote teams videoconference and exchange CAD/CAM drawings in real time; an order fulfillment process that provides instant product reviews and product comparisons via the Internet and automatically connects customers to a competitor's Web site if the item is out of stock. These are the exciting scenarios that lead to dramatic changes and motivate BPR to create value.

3. Which Business Processes Need to be Reengineered the Most? The business processes most often targeted in early BPR efforts are the order fulfillment process and the customer service process (probably comprising about 50 percent of all BPR projects). This is true of manufacturing and service industries. Both these processes are highly structured, can benefit in various ways through new information technologies,

and have direct customer impact. An increasing number of BPR efforts target core supply chain management processes. Recently we have started to see more knowledge-intensive processes such as new product development becoming the focus of BPR projects. However, are these the right business processes to pick for all companies? How do we identify the business process that most needs to be reengineered? Given limited resources, time, and attention, to which process should we direct our efforts?

Strategic logic suggests that reengineering the business processes that add the most value to improved business performance are where we should direct our attention. Or stated another way, we should first focus on core processes that are strategic to the company. These generic statements are roughly at the same level of usefulness as the stock market advice about identifying the right stocks to trade: Sell high and buy low. Peter Keen (1997) provides operationalized advice in regard to selecting the right business process to reengineer by regarding processes as a form of capital assets and liabilities that need to be wisely managed.

Keen provides a classification of processes based on two dimensions of value: worth and salience. The worth dimension classifies processes based on creating or destroying value. Processes are assets when they use the capital invested in them (people, infrastructure, management attention, technology) to create distinctive value for the company—whether in terms of differentiation, reputation, efficiency, or any other value-creating criterion. Processes are liabilities when they drain value from a company and yet have much capital invested in them. The salience dimension has to do with the importance of the process relative to the company's strategic intent. There are several categories of salience: identity processes that define a company to its customers (such as logistics at FedEx and customer service at Singapore Airlines); priority processes that have direct impact on customers and are important; and various types of background processes (some mandated by regulations such as compliance reporting) where investing more capital will not add any more value.

The classification of processes along the two dimensions of worth and salience provide guidelines for choosing which business process to reengineer. For example, identity processes that are liabilities need foremost attention and BPR, while priority asset processes require continuous improvement. BPR on background liability processes may yield excellent performance improvement for that process, but very little overall impact to the company's overall performance.

4. How Successful Are BPR Projects? What Is the Track Record? This is not a straightforward question to answer and there are many reasons why:

- The fluidity of definition of what a BPR project is and what it is not make it hard to accurately assess the success or failure rate.
- There is an aggregate learning effect over time that distorts statistics. We now know more about how to make BPR efforts successful than we did in the early 1990s.
- The current advances in IT infrastructure development and electronic commerce are enabling BPR projects to become more ambitious over time.
- The success rate is dependent on the scale and scope of the BPR project. BPR projects that have broader scopes, a bigger scale, and consequently longer time frames

(such as large cross-enterprise efforts) are less likely to grandly succeed as they are more difficult to implement.

- Similar to other organizational change and information technology implementation efforts, success is very dependent on contextual and organizational factors.
- There are many dimensions to what constitutes success. BPR projects may be successful in that they operationally achieve the process advantage (in terms of reduced cycle time or cost, or increased flexibility or quality) but that may not translate into bottom-line profits or overall corporate performance improvement.

Given the above caveats, one should interpret any statistics about BPR success and failure with caution and qualification. A 1994 reengineering survey of about 100 BPR projects by CSC Index showed that 67 percent were judged by companies as producing marginal or failed results. Thus only one in three BPR projects produced great results. As these large projects were reengineered in the early 1990s when many BPR projects revolved around cost cutting and downsizing, the statistics were not as bad as the trade press interpreted them. It is unclear whether the outcome was any different from the success statistics of other types of large-scale organizational change efforts. If one compares the percentage to the statistic that one out of every ten start-up companies is highly successful, it looks pretty good.

One of the more careful early assessments of BPR success and failure was a study by McKinsey consultants (Hall et al., 1993) of BPR projects in 100 companies in the U.S.A. and Europe. They looked at 20 BPR projects in detail and identified two factors that seemed to make the difference in translating improvements brought about by BPR into companywide profits and longer-term success. The first factor was the breadth of the BPR project; thus the less broad the business process being redesigned was in terms of spanning customer value, the less likely it was to improve performance across the entire business unit. Second, the less the depth of the BPR project in terms of penetrating to the company's core, the less the likelihood of significant business impact. The depth of penetration is the extent to which the BPR project fundamentally changes organizational structure, roles and responsibilities, measurements and incentives, information technology, shared values, and skills (i.e., the organizational environment around the business process). BPR projects that were narrow in scope and not accompanied by fully implemented organizational change did not have any significant overall impact on bottom-line results. Out of the 20 BPR projects, 11 of them achieved less than 5 percent change in earnings or reduction in costs (even though they had reduced process costs by 15-20 percent) while only 6 achieved an average 18 percent reduction in business-unit costs. The latter were the broader, deeper BPR projects.

5. What Are the Types of Failures That BPR Projects Have? A BPR project can fail from a variety of perspectives and due to a variety of reasons. The most common BPR project failures are related to human and organizational issues rather than technical issues. BPR projects have the same types of vulnerabilities that any large-scale organizational change effort has, with the added risk of often implementing new information technologies. Typically failures occur due to a combination of factors.

There are several types of BPR failures:

- Organizational change failures related to ineffective management of organizational transition.
- Project management failures due to ineffective project management of the BPR effort and the lack of use of disciplined methodologies and tools.
- Technical failures related to flawed designs that do not fit the context, or reengineered processes and/or their related information systems not performing as expected.
- Strategic failures where the BPR design and implementation were successful but the expected overall strategic benefit brought about by the redesigned business process did not materialize.
- Sustainability failures where the BPR effort is a one-shot effort that is initially successful but improvements are not sustained as the environment and conditions change.

The commonly identified type of strategic failure is reengineering the wrong process. For example, a new and improved customer service process is faster, more efficient, and provides more extended support for customers but does not translate into a higher customer retention rate or an influx of new customers. A much more dangerous strategic failure, however, is failing to reengineer the right process. The classic 1990 Hammer "Don't Automate, Obliterate" article that launched the popularity of BPR had two illustrative examples. One described Mutual Benefit Life, a large insurance company that reengineered its insurance application process for handling by case managers supported by expert systems on PC-based workstations. The article lauds the quantum improvement in cycle time and performance of the customer service process. However, in 1991 Mutual Benefit Life went nearly bankrupt due to accumulated bad investments. It was placed in rehabilitation and taken over by the state's Insurance Commission. As they say in medicine—the operation was successful but the patient died. Perhaps they might have fared better if they had reengineered their investment decision processes rather than their customer service processes.

6. What Are the Requirements for BPR Success? How Critical Is Top Management Vision and Commitment to the Success of BPR? In order for a BPR project to succeed, a variety of requisite factors must be present. One factor that has been identified as pivotal by a variety of studies is the clarity of vision of top management and their unhesitating commitment to the BPR effort. The McKinsey study by Hall et al. (1993) suggests that for very broad enterprise-wide BPR projects, chief executives may have to commit between 20 and 50 percent of their time in order to have successful large-scale organizational transformation results from the BPR effort. The study also suggests that a senior executive who is above the functional departments be responsible for BPR implementation so that no turf protection occurs. The key roles of top managers in BPR efforts include communicating the vision behind the change, getting early buy-in and full participation at all levels of the organization, and, most importantly, managing fear and anxiety.

The depth of the effort in terms of fundamental organizational transformation (as explained in Question 4 above) is another critical factor for success common to all BPR projects. It is also clear that the softer side of BPR (that deals with the human and

organizational issues) has proved to be more difficult to manage than the technical aspects of process redesign and information systems development.

Other identifiable success factors that vary with circumstances but that cut across BPR projects of various scope and scale include the following:

- Proper project management and teamwork.
- Setting aggressive reengineering targets to motivate out-of-the-box thinking.
- Conducting pilots to test new designs and their implementation impacts.
- Assigning high performers to reengineering teams.
- Giving BPR project participants some release time from their day-to-day job activities.
- Using disciplined BPR methodologies and tools.
- Ability to implement the requisite information technology infrastructure and align with reengineered business processes.
- Moving quickly to capture momentum.

7. How Popular and Widespread Was First-Wave BPR? A 1996 survey by the Deloitte & Touche Consulting Group of over 400 companies in the U.S. showed that 67 percent planned to start new BPR projects over the next two years. BPR was estimated to be a \$60 billion industry in 1996 in the U.S. alone. BPR in the mid- to late 1990s was widespread and a global phenomenon. Various estimates conservatively suggest that about 70 percent of all large companies in North America and Europe were in the midst of so-defined BPR projects. BPR consulting practices thrived and were hiring business school graduates with process skills and information technology awareness in huge numbers.

Given the rapid changes in the business environment, most innovations in management go through a life cycle of popularity that grows and then wanes. The ones that grow to be overly popular suffer the most from the hype of the trade press, the eagerness of management consultants, and the excitability of managers and educators. They become buzzwords and the operational realities and risks associated with the idea are sometimes lost. They then produce backlash and disillusionment when the over-excessive promises fail to materialize, the risks turn out to be greater, and the implementation more difficult than expected. Some of that happened with first-wave BPR. Fortunately, it was a learning experience that made second-wave BPR successful.

When the over-hype is gone, the good, solid ideas with inherent value start to develop healthily and realistically, and serious reflective managers take the time and effort to make them work well. In the late 1990s there was no longer excessive promises in BPR; realism had set in. Managers, consultants, and scholars could better understand the risks and caveats as well as the success factors. Second-wave BPR took hold in a much better informed and realistic environment and is consequently much more successful.

8. What Do the Critics of First-Wave BPR Claim? The valid criticisms of BPR have mostly revolved around the misuse and extreme interpretations and implementations of BPR. Most criticisms came in the early days of BPR, and many of these died down as we learned how to better manage and implement BPR. Perhaps the spirit of the

criticism that was directed to BPR can be epitomized by a joke that made its way into *Reader's Digest* in 1994. Compare a pessimist, an optimist, and a BPR consultant looking at a glass of water. The pessimist will tell you that the glass is half empty, the optimist will tell you it is half full, and the BPR consultant will tell you that you have twice as much glass as you need. The joke captures the essence of the main criticisms leveled at BPR:

- BPR optimizes the present and ignores the future. Many early BPR projects were of the slash and burn type that were designed to cut costs, eliminate jobs through consolidation, and optimize for the short term. In the process of optimizing for the present, they neglected to plan for the future and eliminated expertise and know-how that were needed when conditions changed. We are aware of the misuse of BPR in such situations. BPR does not preclude planning for the future and embedding knowledge-creating and learning capabilities within business processes. Furthermore, developing competence in process execution is a strategic advantage that can be used to grow and enter new markets and new industries. For example, shippers such as Federal Express and UPS have expanded their process expertise in logistics and distribution to help companies manage their supply chains and inventory.

- Extremist BPR with a clean slate approach is impractical. For start-up companies and a very few greenfield situations in which a new operation or area is being developed, starting from scratch is possible. In most business situations however, it is unlikely that people will be willing to obliterate the past learning, skills, and resources that they have acquired. They may think in clean slate terms and try to shoot for quantum improvements in redesigning processes but, in reality, when it comes to implementation they will need to build around what they already have, otherwise it is prohibitively expensive. This book advocates looking at the existing process and its environment and taking advantage of them.

- Unilateral top-down BPR ignores people. Critics claim that BPR is not humanistic. They claim that due to its cross-functional straddling perspective, the champion and leader of a broadly scoped BPR project needs to have an overall view that transcends departments and functions. Thus a top-down directive does not include the participation and ownership of people at all levels of an organization involved with the business process. Certainly BPR projects implemented without participation and ownership will not work, but top-down does not mean people-out.

9. What Were the Experiential Benefits of First-Wave BPR? There is general agreement that the most important experiential benefit of BPR is that it has highlighted the importance of business processes and helped us understand how to redesign them to be faster, leaner, and more robust so that they can drive organizational performance to new heights. Second, it has helped us understand how to use information technologies to enable processes to be executed in new and different ways. Third, the end-to-end emphasis of horizontal processes that extend all the way to the customer has reinforced the value chain management view of organizations. The process-centered IT-enabled value-chain view of the business organization is a dominant perspective that will be with us for many years.

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2-1-2: BPR Methodologies and Information Technologies

1. What Are the Leading BPR Methodologies? Are They Numerous? Section 1-3 in Chapter 1 distinguished between BPR in-the-BIG and the design phase of BPR (the process reengineering phase). The latter is the focus of this book, while BPR in-the-BIG includes the entire BPR project from initial visioning through organizational transformation. There are many nuances of how BPR in-the-BIG can be carried out in practice and what the phases of a BPR project are. The same is true of the process reengineering phase. Each consulting company and BPR group has its own twist to the BPR methodology it uses. These differences are based on the origins of the methodology. Is it an outgrowth of their information systems development methodology? or of their project management methodology? or of their total quality management methodology? or of their organizational change methodology? These differences are also affected by the variety of techniques and tools companies prefer to use within the methodology such as focus groups, process mapping tools, problem diagnosis techniques, and software-based simulation tools. There are as many nuances in these methodologies as there are consulting companies, and there is no universally superior methodology.

There are, however, some generic commonalities that can be understood and act as an envelope to disciplined BPR methodologies. This is the approach taken in this book. Chapter 1 outlined the five typical phases of BPR in-the-BIG as visioning, project mo-

bilization, process redesign, implementation, and maintaining. These phases were identified through publicly available literature and from the practices of consulting companies with prominent BPR practices. The chapter also specifically focused on the process redesign phase and identified the typical phases within it when BPR software is used: scoping the process, modeling, analysis, and redesign, and preparing for process integration. These phases are explained in Part B of this book. The approach taken in this book is geared to the emerging trend of using BPR software as an integral part of process redesign.

It is outside the scope of this book to present a compendium of the numerous BPR methodologies and the various nuances in operationalization that differentiate them. These nuances are not germane to learning how to do BPR and the objectives of this book. For interested readers, an excellent comparison of operational nuances of BPR methods has been put together by the Center for Information Management and Technology Research at the University of South Carolina (Kettinger et al., 1997).

2. What Makes for a Good BPR Methodology? A good BPR methodology should be comprehensive enough to address each of the generic phases of BPR from visioning to maintenance. Furthermore, the methodology should include a disciplined method for coordination between those phases in its execution. BPR methodology is, after all, nothing but a business process with the same problems of hand-offs, adjustment, rework, and iteration that a business process has. BPR methodology too needs to be well reengineered so that it is fast, flexible, and robust and can be more effective if cleverly IT-enabled.

The choice of techniques and methods within each phase and the degree of relative emphasis of various aspects of phases is contingent upon the context of BPR. These contingencies include the scope and depth of the BPR project, the nature of the organizational infrastructure, and the nature of the process. For example, a business process that is loosely structured will benefit from redesign methods and heuristics that are quite different from the ones that would most benefit a very structured process. A BPR project that involves a lot of IT infrastructure change will require much attention to that aspect. A BPR project that builds on a lot of an existing process will benefit from careful mapping and analysis of the existing process.

3. What Is Process Management? What Is the Role of the Process Owner? BPR brings on the mindset of the process-centered organization that is designed around horizontal business processes. It is a move away from the functional organization that is fashioned around compartmentalized functional areas (marketing, accounting, manufacturing) with vertical command-and-control processes. In a process-oriented organization there is a focus on cross-functional activities that add value to a customer, and jobs become larger in scope. This does not mean that functions will vanish in the process-centered organization, but rather that they will be repositioned as centers of expertise. It is almost as though the functions will have staff roles while the processes will be where the work occurs and how value is provided to the customer. As business processes become the central focus there will be a greater need for effective process

management. Process management is the activity of continuously executing, monitoring, reengineering, and innovating business processes so that they are aligned with corporate strategy and the business environment. In the process-centered organization, a company's business process expertise can both support and shape its strategic direction.

When an organization becomes centered around process management, the managerial responsibility structure shifts toward process owners. Some progressive organizations already have organization charts depicted as a set of horizontal business processes. For example, Ericsson (a telecommunications equipment manufacturer in Sweden) displays the name of the process area owner (with photograph) who is the responsible manager as well as a brief description of the mission of the process.

A process owner is charged with end-to-end responsibility and authority for a cross-functional process. The name "owner" is somewhat of a misnomer as the process is really owned by all who participate in it. Process ownership includes responsibility for continuously reengineering and renovating the process and its context so that the desired performance can occur. It includes measuring, monitoring, and adjusting the performance of process to remedy any gaps. The process owner is also responsible for coaching the participants and helping them learn more about the process. The process owner is also responsible for overseeing the acquisition and managing of resources needed for the process, whether these are infrastructure, people, or information.

4. What Is the Difference between BPR Software and CASE Software? What a CAD tool (computer-aided design) is to an engineer and a CASE tool (computer-aided software engineering) is to an information systems analyst, a BPR tool is to a business professional. CASE software is used for *information systems* analysis and design while BPR software is used for *business process* modeling, analysis, and design. Both CASE tools and BPR tools are design tools, although BPR tools are geared to process-oriented business generalists rather than technical information systems specialists.

BPR software enables the capture of the key elements of a business process in a visual representation made up of interconnected objects on a time line. The elements of this visual representation usually include activities, sequencing, resources, times, and rules although there is variation depending on the underlying paradigm driving the software package. BPR software is much more than drawing or flowcharting software in that the objects on the screen are intelligent and have process and organizational data and rules associated with them. BPR software incorporates some aspects of project management in terms of allocating resources and costs to work activities and their time sequencing. BPR software also has "what if" capabilities in that it enables process simulation and performance comparison of alternative process designs. People who use BPR software report that it really helps them better understand their business processes and communicate clearly about their process designs through a common language. The better BPR software packages are quite intuitive and relatively easy to learn.

CASE tools enable the capture of user requirements for information systems design in a visual representation that is made up of data flows, information system processes, and data stores. Comprehensive CASE tools can support design activities across the entire information systems development life cycle from the front-end phases of capturing user requirements to the actual generation of software code that can execute an applications

computer program. CASE tools typically have high learning curves and as a result have only been partially successful in information systems development environments.

BPR software and CASE software are geared to different audiences and have different learning curves and different purposes. Some CASE software vendors have modified their software for BPR and success has been mixed. There have been recent efforts to be able to export the outputs of BPR software (new business process designs in electronic form) to become the inputs to CASE tools (in order to produce the accompanying information systems design and computer code).

5. What Is the Difference between BPR Software and Workflow Management Software? When a business process is redesigned through BPR software, what must happen to the process design so that the requisite information systems and information technology infrastructure can be made ready for implementation? One of the outputs during the process redesign phase in a BPR project is to provide the requisite information system requirements to information systems designers who in turn use them as input to CASE tools or other information systems development tools in order to develop the information systems for the new business process. Alternatively, if the business process is highly automatable and of very high volume (such as insurance claims processing) then off-the-shelf workflow management software packages can be used as an information technology infrastructure to execute the process, rather than developing the systems on a custom basis.

While BPR software is used for business process *design*, workflow management software is used to automate managing the *execution* of the business process when it is in production and being used day-to-day. Workflow management software has its roots in document imaging systems that emerged in the early 1980s (mostly pioneered by FileNet Corporation) well before BPR software. When companies started digitizing their documents and forms in computers, there was a need to automatically route them to the various people who had to work on them as needed. Workflow management software developed around that need and features such as document prioritization, contingent routing rules, event notification, and productivity statistics were added. In addition to off-the-shelf packages, a variety of application development tools such as Lotus Notes can be used to develop workflow applications.

In the early to mid-1990s there was a movement to make workflow management software an integral part of IT-enabled process management architecture. Architectural standards were developed by the Workflow Management Coalition, composed of a group of leading vendors. The architecture conceived linked together workflow management engines (the guts of workflow management software) to BPR tools, information systems development tools, process monitoring tools, and included capabilities for translating across different representation formats. That was one of the technology efforts that pushed us toward the development of process integration IT platforms at the turn of the century, as we shall see in Chapter 8.

6. How Do Information Technologies Change Business Processes? Information technologies can do wonderful things (and some horrible things if not used properly) to business processes. Most importantly for BPR, they enable processes to be executed in new ways. Chapter 3 has many examples.

Some of the ways that IT changes business processes include the following:

- IT automates and speeds up processes. It can also speed up the mess—beware.
- IT breaks traditional assumptions about the physical world. Geography does not matter any longer. Virtual presence and distance collaboration become possible.
- IT is mobile. You can take your work with you and still be connected through portable PCs, phones, scanners, and hand-held computers.
- IT allows information to be shared differently. Electronic information can exist simultaneously everywhere and be shared. Tasks can be done in parallel with better and real-time coordination.
- IT increases interactivity and allows instant feedback.
- IT enables the physical and electronic parts of a process to be coordinated. Bar coding is an example.
- IT enables knowledge to be created, shared, and managed much more intelligently and effectively.
- IT can also of course "compute" extensively and tirelessly and explore decision making options that optimize a process.

7. Should Information Technology Changes Be Agreed on *After* Design Alternatives for the New Process Are Determined? This happens more frequently than one might expect. Business areas often redesign the business process to meet their business requirements and performance objectives first and then start to figure out the information technology changes that are needed. This is driven mostly by the following:

- Not having information systems people on the BPR team.
- An ingrained bias in business professionals that business needs should drive BPR (which is correct), that information technology is a means rather than an end (which is correct), and therefore that information technologies should just support business needs (this one is not correct!). Information technologies generate and shape new business options and process possibilities that would not be thought of or could not be otherwise executed. It may sound like the tail wagging the dog, but it is not so. It is an enabling of new business opportunities.
- Time pressure from management to come up with new process design.

Starting to figure out the information technology options after the redesign of the business process is a trap we should avoid falling into. Not only does it constrain opportunities for better business process designs, it is a major stumbling block in implementation as the BPR team discovers that the existing information technology infrastructure cannot be modified cheaply enough or quickly enough to support the design of the new business process.

8. Which Information Technologies Are Most Critical for BPR? There is no magic technology that is most critical to BPR. The technology depends on the context and the process design. However, business processes generally involve:

- Movement of physical products and paper documents.
- Capture, movement, and generation of information.
- Creation and management of knowledge.

Information technologies that enhance these capabilities are more likely to be useful in BPR. Movement of physical goods is helped by automation technologies; linking that movement to electronic information is helped by bar code technology. Movement of information is aided by networking and communications technology as is the management of knowledge and coordination between people. Internet technologies enable the reach of business processes to be electronically extended to virtually anyone. Knowledge creation is helped by adaptive knowledge bases that learn.

At the enterprise level, there is a basic level of IT infrastructure and connectivity that must be in place to make it possible to have enterprise process integration. Similarly, at the supply chain level, there must be some plug-and-play compatibility between the IT infrastructures of different enterprises so that information can be exchanged among business processes across the enterprises. Chapters 7 and 8 address some of the ramifications of this issue.

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2-1-3: People Issues in BPR

1. What Perceptions Do People Have of First-Wave BPR? In times of recession and economic downturn, the first word associated with BPR is "downsizing." In the first half of the 1990s this created much angst around BPR and fear of job loss at all levels of organizations. In many cases the downsizing was necessary, especially in the larger and more lethargic companies; however, downsizing projects were often disguised as BPR projects. Worry about downsizing and fear of job loss in that era were

legitimate concerns of employees at the clerical, professional, and managerial levels. The employees who remained were relieved to keep their jobs, but found themselves with much larger jobs and responsibilities and stretched (and stressed) to the limit. This was not BPR, but rather brutal disguised cost cutting that, in retrospect, was found to have long-term dysfunctional effects when economic conditions rebounded. It left a bitter aftertaste in people's mouths and has made managing the implementation of reasonable BPR projects much more difficult. The level of resistance to BPR by employees was raised due to those unfortunate distortions.

In normal times, when there is heavy competitive pressure to be lean and nimble along with healthy opportunities for growth, BPR is perceived much more positively. As is typical of any organizational change effort, people still worry about what the change will do to their jobs. The people side of BPR is the most challenging aspect to manage. However, when BPR is used to generate new growth around a business process, participants have a sense of excitement to balance their fear of the unknown. Scholars who subscribe to the socio-technical design approach have been critical of BPR ideologies that undermine the well-being of employees and the quality of their working life. Similarly, the word "reengineer" projects a mechanistic impression in which humanistic concerns are marginalized. In reality, in a well-managed BPR project, the people issues are and must be of prime importance.

2. What Are the Critical People Problems in BPR Implementation? BPR projects are organizational changes. As a result, there are a variety of critical people problems that have to be managed in a BPR project:

- Dealing with fear and anxiety. People worry about changes to their job and how that may affect their career path.
- Resistance to change. Paradoxically, resistance to BPR is proportional to the expected benefits from BPR. When the benefits are greater, the stakes are greater and people are more likely to resist change.
- Difficulty of doing a day-to-day job while undergoing change. Organizations often expect employees to participate in BPR efforts and start thinking creatively of process redesign and implementing change while concurrently continuing to carry out their day-to-day activities without skipping a beat. This is unrealistic and unproductive.
- Perceived erosion of human capital. When radical change is made and old ways of doing things are discarded, there is often a perception by employees that their special skill and knowledge that they built around the old way of doing things is eroding. Unlearning can often be more difficult than learning.
- Disdain of fad-of-the-month phenomena. In a world of hype, consultants, vendors, and flashy trade publications, employees are often hit by new buzzwords and approaches. They become jaded at the thought of going through yet another technique that may turn out to be a short-lived fad.

3. What Can We Do to Effectively Manage the People Issues in BPR? Ultimately, the effective management of people issues in BPR is dependent on context and circumstance. However, there are some general tips and guidelines that are useful:

- Adopt an organizational change lens. BPR is an organizational change effort and people issues have to be managed in that broader context, taking into account organizational redesign, incentives, retraining, implementation strategy, information technology changes, and, of course, business process changes.

- Get up-front buy-in of BPR projects from all participants. Top management leadership and a well-thought-through BPR project plan with a savvy champion will facilitate explaining to all employees involved (and other stakeholders) why the BPR project is necessary and important. Top management must work hard to relieve anxieties and fears about the change and its consequences to build an atmosphere of mutual trust and excitement.

- Promote clear, open, and constant communication with all stakeholders. The objectives and consequences of the BPR project need to be articulated clearly and without deception while at the same time giving people the opportunity to voice their ideas and concerns comfortably throughout the BPR project. This includes all people participating in the BPR project: employees, customers, suppliers, vendors, and consultants. Communication must take place frequently throughout the BPR project and at appropriate milestones, not just at the beginning and at the end.

- Move swiftly but plan reasonably. There is nothing worse than initiating a planned change such as BPR and then not moving swiftly. Change takes energizing and people cannot sustain an intensive effort for too long without becoming skeptical. Quick interim positive results motivate people to continue working hard to make the BPR project a success. While swiftness is important, the schedule and time allotted must be reasonable enough for people to have sufficient time to fully participate and learn. Sufficient time away from day-to-day responsibilities must be planned in order to give the BPR project the attention it deserves without unduly straining people. The speed at which change can move is also dependent on the organizational culture.

- Make the participants the owners. There is a need to align all the participants' interests with the BPR project as a whole, and then to genuinely allow all participants to take ownership of the BPR project. This does not mean a chaotic free-for-all, but rather creating a collaborative environment that encourages initiative and supports people who are willing to take on difficult problems. In an ownership environment, the participants all share the rewards, responsibilities, and risks of the BPR effort.

- Clarify the risks and potential pain of the journey. A BPR project may have setbacks, failures, delays, and difficulties. Participants should be made aware of difficulties that could occur along the way so that they can be prepared. In a well-managed BPR project there is much organizational support in times of difficulty (rather than finger pointing) in order to resolve issues as effectively as possible and continue to move ahead.

4. What Is the Role of the Information Systems Organization in BPR? A BPR project almost always involves one or more business areas, changing of information flows around a business process, and the consideration of information technology (IT) changes. As BPR projects multiply, the load on the Information Systems (IS) organization (department) becomes heavier and more challenging. Contrary to conventional wisdom about first-wave BPR efforts always being led by line managers from business areas, a 1994 survey of IS directors in 350 U.S. companies conducted by the CSC Consulting

Group showed otherwise. Over a third of respondents indicated that they were leading the BPR effort, and about two-thirds indicated that they were catalysts for BPR. This is not a surprising finding for that time given that there were few owners of cross-functional end-to-end business processes and given that, after all, BPR is closely related to IT change. But what is the most effective role for the IS organization in BPR efforts?

There are a variety of possible roles for the IS organization in BPR projects:

- **Catalyst.** The IS organization may help initiate and organize a BPR effort and familiarize line managers with what it entails. The IS organization may also bring together the different business areas that need to collaborate on a BPR project. This is a healthy and useful role.
- **Subcontractor.** The IS organization supplies specific technical skills and performs traditional well-specified tasks such as prototyping, information systems development, database design, technology assessment, and infrastructure development but is distant from the business aspects of the BPR project. This can be very dangerous and costly.
- **Disabler.** When the IS organization is too slow in responding to IS development or to IT infrastructure development necessary for BPR, it may disable and inhibit BPR projects (for example, a BPR project may require an intuitive graphical user interface that cannot be provided by applications currently existing on mainframe legacy systems). This, of course, is undesirable and dysfunctional.
- **Leader.** This is an omnipotent role in which the IS organization initiates, integrates, and manages the BPR effort with the participation of the business areas. While this approach was perhaps a necessity and acceptable for early BPR efforts, a BPR project that is not championed by process owners is doomed to failure in implementation in the long run.
- **Partner.** This is the healthiest and most desirable view of the IS organization in BPR projects. It entails a collaborative partnership between the IS organization and business areas. This partnership may also include customers, suppliers, consultants, and system integrators. From the very start of the BPR project, careful attention is given to the close interaction between IT enablement and alternative business process redesigns as well as requisite organizational change. This is most conducive to having the business areas emerge as enthusiastic process owners at implementation time. This partner role is the most effective for the enterprise as a whole.

At what point in a BPR project should IS professionals become involved? IS professionals should be involved in a BPR project very early and throughout the entire BPR project. When the role of the IS organization in BPR is that of catalyst or partner, this almost automatically happens. When the role of the IS organization in BPR is viewed as that of a subcontractor, it is conducive to the IS organization being involved late in the BPR effort. This causes many problems in terms of discovering very late that the conceived new process redesign cannot be supported through the existing IT infrastructure, or that the systems development effort needed will not be finished in time for the scheduled new process roll-out. Furthermore, had the capabilities of the IT infrastructure been known earlier, a different business process redesign that takes advantage of its capabilities would have been proposed. Redesigning the business process first without the par-

participation of the IS department and then asking them to implement the requisite IT infrastructure can be the kiss of death for a BPR project.

5. What Mindset and Skills Must a Business Professional Develop for BPR?

From first-wave BPR we learned that in order to be a more effective participant in BPR projects and also to help a participant's career path, the following mindsets and skills are especially important:

- Value-adding business change orientation. This is the mindset that a business professional needs in a BPR project in order to be a more effective contributor. It means being ready to spend more time interacting with customers in order to better understand how to provide more value. It means being aligned with the objectives and strategy of the entire enterprise.
- Business process thinking. Business professionals need to learn how to think in terms of horizontal business processes first and information system flows second. They should be able to use BPR software tools, model and analyze processes, and understand the different ways that business processes can be redesigned.
- IT infrastructure awareness. Business professionals need to be aware of how IT infrastructure plays into executing business processes quickly and flexibly and how IT infrastructure both shapes and enables new ways of executing business processes.
- Facilitation skills for organizational change. Gaining facilitation skills for organizational change means knowing how to promote change by helping the capacity and skills of business areas and customers for BPR. It also means understanding the organizational transformation and supply chain changes that accompany BPR.

In addition, IS professionals who want to be effective participants in BPR projects need to develop rapid information systems development skills. Rapid information systems development is a critical component of successful BPR projects. IS professionals are most valuable when they understand and can comfortably use techniques for rapid systems development that are helpful to BPR. Examples are rapid prototyping for testing and discovering solutions, taking advantage of reusable modules, and the use of object-oriented methods.

As BPR entered its second wave, these skills and mindsets requisite for business professionals to become effective participants in BPR for e-business have been further enlarged:

- Understanding process-enabling capabilities of Web-based IT infrastructure. The second wave of BPR is Internet-centric. The business professional must know how this enables new ways of executing processes in business-to-business and business-to-consumer e-commerce.
- Appreciating supply chain management. The second wave of BPR brought with it the need for increased cross-enterprise collaboration with rapidly changing and multiple partners. It is important to understand how processes that cross many enterprises and partners work, whether they are customer service, distribution, or sourcing processes. Understanding how supply chain processes are managed is essential for participating effectively in BPR for e-business.

- Grasping the concepts of knowledge management. As information flows and exchange multiply rapidly, many of the opportunities for creating value come from taking advantage of the knowledge and intellectual capital that this information exchange creates. The second wave of BPR brought it with new opportunities for redesigning processes for knowledge work. Understanding how to change knowledge management around a business process is a definite advantage in BPR for e-business.

We hope this book will help you in gaining these mindsets and skills!

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2-2: BPR FOR e-BUSINESS: WHERE THE SECOND WAVE IS TAKING US

2-2-1: BPR and Supply Chain Management

1. What Is the Relationship between BPR and Supply Chain Management? BPR is typically performed on one of an enterprise's end-to-end business processes that extends downstream all the way to the customer. Similarly, the business process can be extended to include upstream activities all the way to the suppliers who provide inputs to the business process. This chain of activities may include several enterprises. For example, a retail store that sells bicycles to consumers is part of a chain that starts from manufacturers of bicycle parts (tires, lights, brakes) who supply these parts to a bicycle manufacturer who assembles the bicycles. The manufacturer ships the bicycles to a distributor's regional warehouse. The distributor ships the bicycles to the retail store through a trucking company. This sequence of activities through the various enterprises is commonly referred to as the supply chain.

If the retail bicycle store wants to do BPR on its order fulfillment process, it will probably find many more opportunities for improving the process for its customers if it examines the entire supply chain all the way back to the manufacturers of the bicycle parts. This would require all these enterprises to get together and collaborate on improving the order fulfillment process throughout the supply chain and throughout each of their own enterprises. This is how dramatic gains and strategic advantage are often gained: The entire supply chain has to be reengineered. Competition no longer means

one company competing with another company—it means an entire supply chain competing with another supply chain. *Competitive* advantage can be gained through *collaborative* advantage.

It is impractical for the retail bicycle store, a small player in this supply chain, to initiate the reengineering of the entire supply chain. So, in thinking through how to redesign its order fulfillment process, the retail store will probably treat the upstream enterprises as a "black box" whose insides are unknown and that just provides inputs through the distributor to the retail store's process. Perhaps it will try to have the distributor change some of its inputs to the process (by having the distributor providing preshipping information earlier, for example) but it usually will be unable to radically change the distributor's business processes. Thus, rather than reengineering the supply chain, the retail store will have to limit its BPR efforts to its own value chain. While the terms supply chain and value chain are often used interchangeably, the value chain view typically suggests that the details focused on are mostly limited to the one enterprise whose value chain is under consideration.

It is most useful to have a supply chain perspective when doing BPR (and after all that is what "end-to-end" truly means), but it is difficult to change processes that are in other enterprises in the supply chain. When a supply chain includes a powerful player, it is more likely that BPR efforts that change the entire supply chain can be initiated. For example, Chrysler Corporation, a large and powerful company in its supply chain, was able to change the business processes through which its many suppliers provided parts to it through EDI (Electronic Data Interchange). In order for the change to work well, it also had to convince its suppliers to change their own internal processes. The benefits from making the chain of processes faster and leaner accrued to all the companies in the supply chain, including Chrysler.

Supply chain management involves managing a company's ability to balance a stream of products and processes with meeting customer demands for delivery and flexibility. As illustrated in the above example, supply chain management is intimately related to horizontal business process management across enterprises. Consequently, BPR for more effective supply chain management was one of the driving issues of second-wave BPR.

2. What Is the Connection between BPR and Fast Response Management?

Fast response management is a strategic posture adopted by a company that seeks to add value for customers by making business processes fast, focused, and flexible. The need for speed and flexibility has been treated under many different names and comes in a variety of flavors. In strategic contexts, it is labeled as time-based competition. It has been called agile manufacturing in the manufacturing arena where it is associated with just-in-time techniques, flexible manufacturing systems, and synchronized logistics. The retail industry calls it quick response, and the grocery industry calls it efficient consumer response. These sets of approaches are grouped together under the umbrella of fast response management.

Fast response management is connected to BPR in more than one way. It is like BPR in that it focuses on process advantage and is enabled through information technology.

Like BPR, it is more effective if a supply chain perspective is adopted. Again like BPR, it attempts to make a business process faster and more flexible. Finally, and most interesting, the adoption of fast response management ideas in BPR provides an excellent approach for process diagnosis. It has been shown empirically and it can be argued logically (Stalk & Hout, 1990) that focusing on cycle time will usually uncover and fix many problems of cost and quality while the reverse is not true. By examining the time delays in the various parts of a process and associated hand-offs and trying to reduce or eliminate them while adding value for the customer, we automatically will improve quality (less rework, for example), reduce cost (resources committed for less time, for example), and preserve the requisite variety.

3. What Is the Influence of Packaged Supply Chain Software on BPR? In the past few years there has been a rapid growth in off-the-shelf enterprise-wide software packages that help manage supply chains more effectively. These software packages cover a spectrum that ranges in functionality from providing a support infrastructure for executing business processes across an enterprise's value chain (typically called enterprise resource planning software) to fancy optimization tools for production planning and logistics across an entire supply chain (typically called supply chain management software). There are many software packages along this spectrum and a blurring of some capabilities across the categories. For example, software packages at the enterprise resource planning end of the spectrum (such as products from Baan, J. D. Edwards, Oracle, PeopleSoft, SAP) often have capabilities for materials requirements planning that are in supply chain management software (such as products from i2 Technologies, Manugistics).

All these types of enterprisewide software are expensive and take months to implement as part of a BPR project. The expense and magnitude of effort required for organizational implementation of such software can be both beneficial and constraining to the BPR effort. For example, SAP's popular software product (R/3) has application modules that can support a process flow that spans several functions: manufacturing, finance, sales and distribution, and human resources—and in a way that a piece of information is only entered once into the computer and is propagated everywhere. This cross-functional integration capability in the software acts as a guiding template of best practices for the BPR effort and forces the company to reengineer the business process so that it is cross-functional; otherwise the R/3 product cannot be effectively used. At the same time, R/3 is highly structured for top-down companies and requires that each division of a company operate in the same way. For companies that prefer to allow divisions to benefit from operating in unique ways, the difficulty and expense of modifying the software often forces them to standardize their divisions' processes rather than modify the software.

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2-2-2: BPR and Knowledge Management

1. How Is Knowledge Management Related to Second Wave BPR? Knowledge management is a set of activities aided by information technology infrastructures that are designed to help enterprises more effectively create, capture, synthesize, deploy, share, preserve, and reuse organizational knowledge. In the late 1990s, enterprises started to focus attention on understanding how to manage organizational knowledge more effectively, as products and services become more knowledge-intensive. But what is an organization's knowledge?

Organizational knowledge is an elusive concept to define and is not yet well understood. It is not a more grandiose word for information, rather it is a multifaceted concept. It can be thought of as having three faces that are exhibited simultaneously:

- Knowledge as object (what an organization knows). This is a view of knowledge as patterned information that produces insight. It brings with it a perspective on knowledge management that centers around managing knowledge repositories that can be reused effectively.
- Knowledge as process (how an organization learns something new). This is a view of knowledge that centers around the process of knowledge creation and knowledge sharing as learning. It brings with it a perspective on knowledge management that works at enhancing shared knowledge creation around business processes and accelerated learning.
- Knowledge as capability (how well an organization uses what it knows). This is a strategic view of knowledge that treats it as a core competency connected to know-how and intellectual capital. It brings with it a perspective on knowledge management that has to do with the potential synthesis and application of knowledge to new situations.

Enhancing any of these three facets around a business process can create a better knowledge management environment and, in effect, redesign the process (i.e., BPR). This is especially true for knowledge-intensive business processes such as new product development or customer support, which have received increased attention with second-wave BPR.

It has been pointed out earlier that one of the approaches that constituted second-wave BPR was based on more effective knowledge management around business processes. Section 1-5-2 in Chapter 1 gave an example of the process redesign heuristics that can be used to change knowledge management and increase the knowledge-creating capacity of a process. Thus BPR can be done by expanding the knowledge-creating capacity of the process so that it learns more effectively through the interactions of its various participants, effectively giving the process a "mind" to help it function better. Chapter 3 provides several principles and tactics for changing knowledge management around business processes.

2. How Does the Reengineering of Knowledge Work Differ? The reengineering of knowledge work is more difficult than the reengineering of clerical and production work, and we know less about how to do it well. Business processes that include intensive knowledge work are typically more difficult to tightly structure and automate through workflow management. As pointed out in Chapter 1, a business process such as order fulfillment is highly structured and follows a series of well-defined predetermined steps every time the process is enacted. A business process such as new product development is more fluid and cannot be tightly predetermined to be repetitive. It follows that redesign heuristics that center around increasing the knowledge-creating capacity of the process may be especially useful for knowledge work, rather than heuristics that try to restructure the architecture of the process. Furthermore, the information technologies that are likely to enable new ways of carrying out knowledge-intensive business processes may also be different: group technologies for collaboration, search engines and data mining tools, and adaptive databases.

3. What Is the Relationship of Customer Relationship Management (CRM) Software to Knowledge Management and BPR? In the late 1990s another type of enterprise management software emerged in the marketplace: customer relationship management (CRM) software. While enterprise resource planning systems (ERP) focused on the back-office and transactional data, CRM systems focused on the front-office and relationship data. CRM systems are an outgrowth of sales force automation systems that developed in the early 1990s. These systems provided a way for capturing and organizing customer contact information for salespeople. Sales force automation systems then grew to become sales, marketing, and customer service systems that developed into front-office systems (i.e., the systems for interfacing with customers). CRM software includes functionalities such as lead/opportunity management, telesales management, database marketing and customer profiling, sales configuration modules for configuring products, interactive marketing encyclopedias, and call center management. CRM software is growing at 50 percent per year at this writing and the current market leader is Siebel Systems.

As second-wave BPR appeared and supply chain processes were being redesigned to be cross-functional, the front office was no longer the private domain of the sales department but rather the focus of the entire company. As the business environment moved further toward customer-centricity and a service-based business model, the CRM process became a critical enterprise process to be redesigned and improved. CRM is the customer life cycle process of identifying, securing, nurturing, and keeping customers. It involves acquiring new customers (say through direct marketing), enhancing profitability of existing customers (say through call centers or cross selling) and keeping profitable customers (say through profiling or loyalty programs). CRM software includes capabilities for interfacing with a large enterprise database or data warehouse that organizes all the data captured through the numerous interactions during the CRM business process. This information can be sliced and diced in different ways, inferences made, and knowledge about customer relationships created and grown. CRM software allows different ways of managing knowledge around front-office processes and thus enables BPR of these processes. As opportunities for creating value in e-business settings

continue to grow around capturing customer knowledge and redesigning customer interaction processes, CRM software may become the driving backbone of enterprise IT architecture.

This opportunity has not escaped ERP vendors, who have rushed to integrate ERP with CRM through internal development projects (such as SAP and Oracle) or acquiring CRM vendors (Peoplesoft acquired Vantive and Baan acquired Aurum) or by allying closely with CRM vendors (J. D. Edwards allied with Siebel). The ERP vendors' idea is to integrate the back-office and front-office processes together through their expanded software. The CRM vendors claim that ERP systems are not geared for customer relationships but rather for resource efficiency and transactions. In an era when knowledge management is becoming critical for improving enterprise and supply chain processes, CRM front-office software will add the most value to business processes.

4. Can We Measure How BPR Applied to Knowledge Work Translates into Value? When a process is redesigned to be more knowledge-creating, it is tricky to measure the added value to the customer of the process. One of the characteristics of such a redesign principle is that it causes the business process to learn more from the participants it interacts with each time there is an interaction. Thus the value of the process increases over time as intellectual capital through repeated execution, even though initially there is no immediate added value for the customer. It is difficult at the design stage to measure what the return on redesigning the process might be. The quicker that the new knowledge in the process can be translated into value that the customer is willing to pay for (whether through this business process or a related one), the more effective the business process design is. This is one of the central tenets of Knowledge Value-Added (KVA) methodology (Kanevsky & Housel, 1995; Housel and Horn, 1999).

KVA is a leading-edge methodology, but there are over 40 case studies of companies using it to help guide the reengineering of core processes (examples at www.businessprocessaudits.com). Advances have been made by Housel and Kanevsky to measure return on knowledge (ROK) as a way of comparing how much value different BPR alternatives provide to a process. They are working to extend their techniques to link the ROK ratios with external financial indicators such as earnings per share. As second-wave BPR continues to emphasize the importance of creating value quickly and value can be created through increased knowledge creation around processes, such techniques will become increasingly central for guiding BPR.

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2–2–3 BPR and Web-Enabled e-Business

1. How Will Web-Enabled e-Business Change the Nature of Second-Wave BPR?

This question permeates the entire book, but specific chapters elaborate on particular aspects. BPR for e-business is introduced in Chapter 1 and its nature explained. Chapter 3 addresses the principles and tactics of process redesign for e-business by laying out a framework termed the e-business speed loop. Chapter 7 explains a methodology for how collaborative supply chain processes for e-business can be redesigned. Chapter 8 elaborates on IT integration options for e-business processes and also outlines the additional implementation challenges that come with organizational transformation to e-business. There will be no attempt at summary here, but we will point out a number of common themes:

- BPR for e-business involves redesigning both enterprise and supply chain processes around the Internet. Redesigning *collaborative* supply chain e-processes will constitute a major focus of BPR for e-business. By an e-process, we mean a process that will be executed through computer applications from each enterprise communicating with each other through the Internet.
- The urgency of BPR will increase further as brick-and-mortar enterprises race to transform their processes for e-business. BPR for e-business will involve reconfiguring business processes for new partners and new products much faster than in the past and redesigning these processes so that they execute faster and provide learning faster.
- The change in business models for creating value quickly will further drive BPR for e-business. BPR for e-business will probably involve more radical transformation than in the past in terms of scale, scope, and speed.
- There will be many more opportunities and ways to change the information flows and knowledge management around a business process as a method of BPR.
- The ubiquity of BPR will increase as the urgency of e-business permeates smaller companies. This will be the case for both business-to-business and business-to-consumer contexts.
- The process of carrying out BPR will very likely change to take better advantage of the Internet and intranets to support collaboration on BPR projects. As BPR software tools become increasingly compatible with each other, it will be possible to exchange standard process templates in electronic form across the business community. Reusability of

process designs will facilitate and speed up the design part of BPR for common processes such as order fulfillment. This will be especially helpful for smaller companies that do not have entrenched business processes and they will be able to more easily gain access to best practices.

2. Will BPR for e-Business Be Different for Brick-and-Mortar Enterprises Than It Is for Internet-Only Enterprises? A brick-and-mortar enterprise is a slang name for a company that invested heavily in physical buildings (factories, offices) and typically has many physical locations through which customers interact with it. An Internet-only enterprise is a company whose business processes and products exist only on the Internet. Thus an Internet-only enterprise provides only digital products (downloadable music, downloadable software, for example) or electronic services (financial services, information, electronic transaction processing, for example), and makes these available only through the Internet channel.

As we move into e-business, most enterprises will typically be hybrids and can be characterized as “click-and-mortar” enterprises that exist both on the Internet and in the physical world—whether they are Internet “natives” or Internet “immigrants.” Amazon.com started as a bookstore on the Internet and is an Internet native. While its front-office processes and customer interface are purely electronic and it has no physical retail stores, its back-office processes heavily involve the warehousing and physical distribution of physical goods (books, CDs, toys). Barnes and Noble started as a bookstore in the physical world but immigrated to the Internet. Its front-office processes include both electronic interfaces to customers and physical retail stores that customers can visit.

The small percentage of Internet-only enterprises that currently exist will need to worry mainly about electronic business processes in their BPR efforts, as they have minimal physical processes. The extent of investment in IT infrastructure will be comparatively much higher than their click-and-mortar counterparts. As they are currently fairly young enterprises, they have the luxury of starting with a clean slate approach and creating new business processes without the legacy of the past. Given the rate of change in the e-business environment, they too will soon be redesigning their business processes.

For the majority of enterprises (the click-and-mortar ones) BPR for e-business will involve redesigning both the electronic and physical aspects of business processes and how they interact together, although the electronic processes will play an increasingly larger role in e-business. Any enterprise that provides physical products (physical objects) or physical services (that involve face-to-face human contact) to its customers will still have both physical business processes and electronic business processes as it becomes an e-business. However, the BPR implementation realities will differ between the Internet natives and the Internet immigrants as their legacy processes have different infrastructural baggage that they bring to a BPR project.

3. How Will e-Processes Be Managed? Will business processes be managed differently across enterprises in an e-business world? Will there be different organizing

models other than the supply chain process model? How will e-processes be executed? This is the next frontier for BPR for e-business.

It appears so far that the supply chain process model will evolve to a different structural form that is more advantageous to e-business. It will be a form of organizing in which e-processes have primacy over physical processes, and physical business processes are rebundled and redesigned around e-processes. It also appears that business processes will be rebundled around process competences and process complementarities. Each enterprise in the supply chain will be responsible for executing the process that it does best all the way to the customer. Thus one enterprise may be responsible for the sales and marketing process, another for order fulfillment, and yet another for customer service, but they will all be electronically orchestrated through one interface to the customer. This form of tight orchestration among enterprises directly around the customer is only possible with seamless Internet connectivity across processes. It is also a model of organizing in which rich information flows from collaborative relationships fuel knowledge creation. This new form of organizing supply chains has been termed the "orchestrated e-process" model (El Sawy, Gosain, and Malhotra, 1999).

The ubiquitous connectivity of the Internet and the need to organize supply chain processes differently for e-business have given rise to a new form of enterprise called a portal. Portals have arisen at the interstices between enterprises in e-business supply chains. A portal in the e-business world is a coordinated access point in the form of a Web site that provides business solutions and services, knowledge and information, or software tools. Vertical portals target particular industries (for example, the chemicals industry) while horizontal portals provide a particular type of service to a broader market (for example, providing online maps to consumers, travel agencies, and car rental companies). Common types of portals include knowledge aggregators (who aggregate knowledge about a fragmented market at one point) and application service providers (who host computer applications such as ERP and CRM through their own Web site). For the world of process management, a new type of portal is emerging that is being called a process portal or a process hub. These new enterprises see their role as one of orchestrating e-processes across supply chains for other enterprises as a business service. Until such time as compatibility issues between e-processes from different enterprises are resolved, process portals will probably play a critical role in process management for e-business.

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3

PRINCIPLES AND TACTICS OF PROCESS REDESIGN FOR e-BUSINESS

3-1: THE e-BUSINESS SPEED LOOP FOR THE ENTERPRISE

3-2: REDESIGN PRINCIPLES AND TACTICS

3-2-1: Principles and Tactics for Restructuring and Reconfiguring Processes (Restructure It)

3-2-2: Principles and Tactics for Changing Information Flows around the Process (Informate It)

3-2-3: Principles and Tactics for Changing Knowledge Management around the Process (Mind It)

WHAT CHAPTER 3 IS ABOUT

This chapter provides principles and tactics that can be used for redesigning enterprise processes in e-business situations. The chapter first lays out a framework for understanding the process environment of e-business hinging on speed and fast response in which enterprises compete and exploit opportunities by learning faster and reconfiguring and executing their processes faster.

The chapter then lays out 10 principles and examples of associated tactics for second-wave BPR. The principles and their associated tactic are of three types: principles/tactics based on changing the configuration and structure of processes; principles/tactics based on changing the information flows around processes; and principles/tactics based on changing knowledge management around processes. Examples from business practices are used for illustration.

3-1: THE e-BUSINESS SPEED LOOP FOR THE ENTERPRISE

Section 1-2-2 in Chapter 1 presented the evolution of business process improvement approaches and noted that we are now experiencing second-wave BPR. First-wave BPR, which was driven by downsizing, ended in the mid-1990s. As we enter the millennium

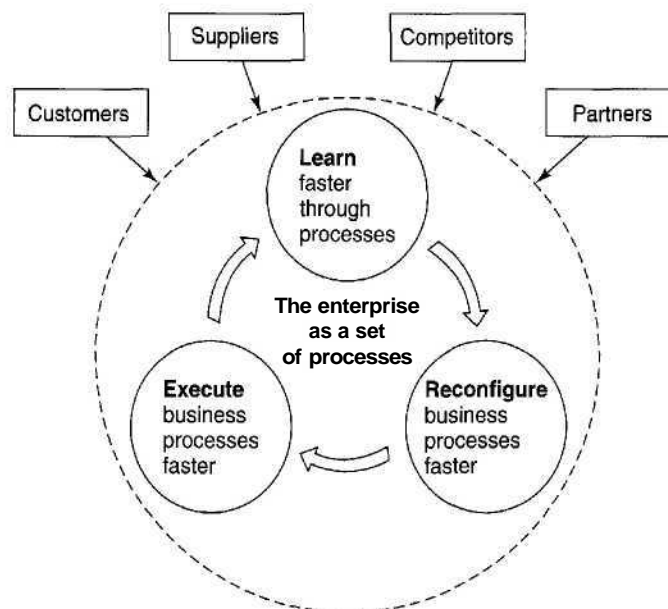
we are experiencing a growing second wave of BPR that is coalescing around e-business. Second-wave BPR brings together the techniques of supply chain management, fast response management, and knowledge management while taking advantage of Internet technologies and the Web. This confluence of techniques is driving the redesign of enterprise processes for e-business.

In an e-business environment, the enterprise is driven by its competitors, customers, suppliers, and partners to strategically transform itself into a full-fledged participant in e-business. Its competitors are using e-business capabilities for competitive advantage, and its partners, suppliers, and customers are increasingly demanding the same capability. The need to respond and transform enterprise processes is happening under tremendous time pressure as enterprises race to become e-businesses. We call the scramble that enterprises are going through to redesign their processes for e-business the "e-business speed loop" (see Figure 3-1) and we use this loop as a framework from which to derive the principles of business process redesign for e-business.

In the e-business speed loop, enterprises compete and quickly exploit new opportunities offered by e-business through faster execution of three sets of strategic capabilities that feed into each other in an endless loop:

1. *The capability to reconfigure business processes faster.* Enterprises need to constantly rethink how they partner and execute their processes with customers and suppliers in the supply chain to take advantage of opportunities. This will require the capability to reconfigure processes for new partners and new products much faster than in the past and will require much deeper knowledge of partner processes. The need for such a capability has been identified through work by El Sawy, Gosain, and Malhotra (1999).

FIGURE 3-1 Strategic forces driving the e-business speed loop for the enterprise



2. *The capability to execute business processes faster.* Whether the business process is new product development, order management or customer service, with e-business the pressure has never been greater to execute operational processes faster and more flexibly. Enterprises will continue to redesign their business processes for fast response. The need for such a capability has been identified by Stalk & Hout (1990) and bolstered in the e-business context by Gates (1999).

3. *The capability to learn faster through processes.* With the rapid and constant change in the business environment that is accelerating with e-business, the enterprise that can learn the fastest will have the competitive advantage. Learning faster means understanding changes in customer requirements and competitive market conditions faster, developing valuable know-how faster, and learning how to do business with new partners faster. Enterprises will increasingly redesign their business processes so that they can learn faster. The need for such a capability has been identified through work on the knowledge value spiral by Housel and Bell (1999).

The e-business speed loop provides the framework for deriving the principles of process redesign for e-business. Thus all 10 principles and their associated tactics originate using the properties of the e-business speed loop as a backdrop. As explained in Chapter 1, processes can be redesigned by changing their architecture and flows, the information technologies that enable them, the organizational structure that houses them, and the people skills, incentives, and performance measures of the people who execute them (see Figure 3-2). While the principles that follow focus primarily on process architecture and how it is enabled by e-business technologies, they acknowledge the interplay with the other factors.

3-2: REDESIGN PRINCIPLES AND TACTICS

Tactics for redesigning the architecture of business processes for e-business are bounded only by the designer's imagination. New tactics are discovered as the world of business evolves and as new information technologies enable different ways of conducting e-business. What are some of the common tactics for redesign and what are the principles that drive them ?

As explained in Chapter 1, the general driving assumption in business process redesign is to maximize the value-adding content of a process and minimize everything

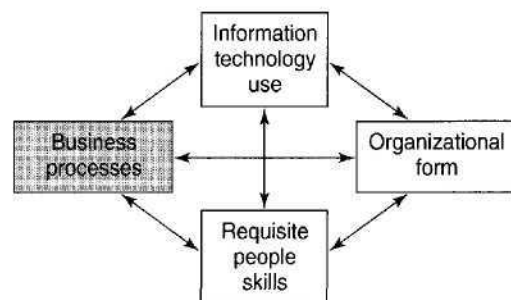


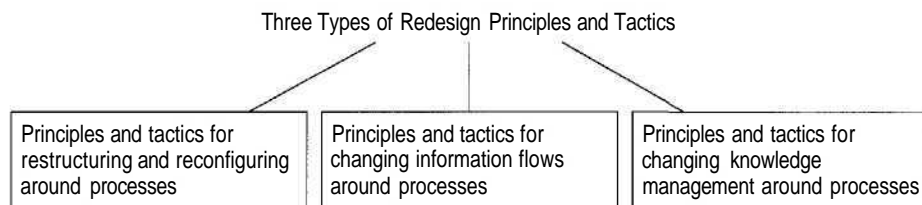
FIGURE 3-2 Factors that interact with business process changes

else. Value can have many forms that can be measured through surrogate performance measures such as speed, cost, learning, and return on investment. Thus, the ground zero common sense principle in business process redesign is to streamline the process to minimize waste, remove valueless complexities, obliterate unnecessary obsolete activities, and consolidate similar activities.

Principle #0: STREAMLINE

Remove waste, simplify, and consolidate similar activities.

Beyond this ground zero commonsense principle, what are some of the principles that a designer can follow, especially in an e-business context?



As illustrated in Chapter 1 (section 1-5) business process architectures are redesigned by changing the topology of flows associated with them, whether these flows be related to physical product, information, or knowledge. This section identifies 10 principles and associated common tactics for redesigning the architecture of business processes for e-business. They are divided into three types:

1. Principles/tactics based on changing the configuration and structure of processes.
2. Principles/tactics based on changing the information flows around processes.
3. Principles/tactics based on changing knowledge management around processes.

Each principle is presented with some of its common tactics and illustrated with examples from practice. Understanding both the principle and its common tactics in context provides richer insight for generating new redesign tactics and principles.

3-2-1: Principles and Tactics for Restructuring and Reconfiguring Processes (Restructure It)

Principle #1: LOSE WAIT

Squeeze out waiting time in process links to create value.

Common Tactics

- Redesign time-sequential activities to be executed concurrently.
- Create closed-loop teams for quicker flexible interaction.
- Do not allow a support activity or management activity to gate a core value-adding process.
- Design for continuous flow rather than stop-start batches.
- Modify upstream practice to relieve downstream bottlenecks.

Essence: Stalk and Hout in their classical book on time-based competition have shown empirically that in traditional enterprises most products and many services are

actually receiving value less than 5 percent of the time they are in a business process. For the remaining 95 percent of the time, they are waiting and no value is being added. What slows up a process typically are the process interdependencies or hand-off times. It is the "cracks" in between processes where delays occur and flexibility breaks down. When a process has to wait for another process to be completed, there are many opportunities for delay. In e-business these delays do not just occur in internal processes but also across the entire supply chain. Business processes can be redesigned to squeeze waiting time both upstream and downstream in the supply chain.

Concurrency: A process can be speeded up by changing some of its sequential activities to be carried out concurrently. For example, launching a new product such as a camera includes both the design of the new product and the design of tooling to manufacture it. Waiting until the design is finished to design the tooling delays the process and is not the cost-effective way to get optimal designs for both product and tooling. Carrying out both the product design and the tooling design concurrently while having both processes interact for mutual adjustment of design is faster and more cost effective. With CAD/CAM and groupware technologies, concurrency is much easier to carry out and sharing across both processes can be very fast.

Closed-Loop: A process can be redesigned so that all the people necessary to deliver the outcome of the process and make the process flow smoothly are together in one coordinated team that crosses functions and specializations. This is called a closed-loop team. In order for the loop to close on a process, it must be tightly organized around the delivery of process outcomes. A closed-loop team can handle variety and exceptions much more effectively and rapidly than an open-loop process. In an open-loop process, there are hand-offs that can cause variable delays depending on the workload in different departments. The closed-loop team often interfaces with customers through a case manager who handles all customer communications.

Flagstar Bank in Michigan redesigned its home mortgage loan approval process to speed up the process. Using videoconferencing, the bank has created a virtual closed-loop team that can flexibly handle any problems arising in the process interactively and rapidly. It has installed desktop videoconferencing applications in about 500 of its allied mortgage broker offices nationwide. When a borrower walks into one of these mortgage lender offices, the loan officer initiates an online connection with a Flagstar underwriter in Michigan who receives an electronic application. During a video conference, the underwriter reviews the application with the borrower and any sticky questions or exceptions are answered interactively on the spot. Information gathered during the personal interview is then sent to an automated underwriting system that analyzes the borrower's credit records and other factors and a response is received within minutes. The entire approval process takes about an hour, which is a dramatic improvement over the traditional processing time of 45 days when faxes and phone calls were traded back and forth among the loan officer, the underwriter, the credit analyst, and an approving manager.

Not Gating Main Process: A process can be redesigned so that support activities or management activities do not gate core value-adding processes and delay them. A customer credit check should not hold up the scheduling of a shipment for a customer in an order fulfillment process if typically very few customers fail to qualify for credit. In

general it is much costlier to delay the main value-adding process with credit checks than it is to pull the occasional order from the schedule, especially in an e-business environment where speed of process execution is critical.

Continuous Flow: Continuous flow that services customers of the process as they arrive has less delays on average than processes servicing customers in batches. Errors are detected later when flow is lumpy, which further adds to delay. An online ordering process that confirms orders as they are placed individually and notifies the logistics provider to ship the product is much less prone to wait than one that batches the notifications.

Upstream Relieves Downstream: In a supply chain environment it is often more advantageous to relieve a downstream bottleneck by modifying an upstream practice. For example, supermarkets and retailers who want to speed up the stocking of shelves let their suppliers know what their exact shelf configurations are. Then suppliers can ship the goods packaged in such a way that they fit exactly on the customers' shelves.

Principle #2: ORCHESTRATE

Let the swiftest and most able enterprise execute.

Common Tactics

- Partner a process with another enterprise.
- Outsource a process to another enterprise.
- Insource a process back into the enterprise.
- Route the process through an infomediary.

Essence: A business process can be redesigned by orchestrating how a group of enterprises can collaborate on jointly executing and coordinating different parts of the process. Orchestration enables an enterprise to take advantage of another enterprise's special skill or speed of execution to improve the effectiveness of a process. In the e-business context there is a broader array of orchestration tactics than was possible in the past. This is due to the increased capability for enterprises to exchange information for coordination quickly and easily through electronic networks and the Web.

It is not uncommon for an enterprise to outsource business processes that require know-how not within its core competence. Reasons for outsourcing a process (or part of it) could be that the other enterprise has more expertise and a better infrastructure or can execute the process cheaper or faster. When the process that is outsourced is a support process (such as payroll processing), the coordination requirements are not high. However, when a portion of a core process is outsourced (such as logistics in the order fulfillment process), the orchestration requires intensified coordination between both enterprises and is much more of a partnership and joint execution than outsourcing.

A business process can also be redesigned by bringing it back in-house instead of having it carried out by another enterprise. Reasons for insourcing a process (or part of it) could be for better control and coordination or faster cycle time or a desire to build expertise around that process. Insourcing often simplifies coordination with other parts of the process as it is brought in-house. It is often accompanied by hiring or training personnel to carry out this added part of the process.

With the emergence of the Internet there has been a rise in a new type of enterprise called an infomediary. An *infomediary* is an intermediary who gathers and sells information

about a market and creates a business and technology platform on which buyers and sellers can do business. An infomediary acts as an aggregator and helps buyers in fragmented markets select products by providing pricing, product, and sourcing information as well as a single point for service. Routing part of a business process through an infomediary can benefit the speed, cost, and quality of the process.

Partnering with other enterprises in the execution of processes is a hallmark of supply chains and e-business, and there are many more orchestration tactics that will emerge in the years to come.

Partnering and Outsourcing: Diamond Multimedia is a manufacturer of multimedia devices for personal computers. Its traditional products include video graphic boards and accelerators. It competes in an industry where rapid introduction of innovative products is critical. Diamond typically distributes its products through wholesale distributors, value-added resellers, system integrators, and retailers. Its sales and order management processes are designed to interface with these indirect channel partners. In 1999 Diamond introduced a new device called the Rio. The Rio is a small portable music player that can store and play back CD-quality music that is downloadable from the Internet. Diamond realized that its target market was Internet users and that it would be more advantageous to sell the Rio directly through the Internet than go through its traditional indirect channel. To accommodate this new channel and the high volume of individual orders anticipated, it needed to redesign its order management process.

Diamond's order management process was originally designed for large orders to indirect channel partners. It now needed to redesign this process to quickly execute "quantity of 1" direct orders by individual consumers over the Internet. While Diamond already had an online Internet store, it was designed to handle only a very small number of orders. As well, the order fulfillment process was executed manually by Diamond's customer service department. Diamond realized that the process had to be redesigned to handle much higher volumes of one-at-a-time orders, to have rapid delivery time, and to be able to handle high-volume credit card processing. It also realized that with a very short lead time until product launch, it did not have the infrastructure or expertise to implement a redesigned process internally. It decided to outsource a large part of the order management process for the Rio product line to Skyway, a logistics provider that could supply order fulfillment services and same-day product shipment with the support of a sophisticated IT infrastructure. Diamond realized that, with Skyway as a partner, it could fulfill its requirements faster, better, and cheaper.

The order management process was redesigned so that Diamond would handle the Internet order site and marketing while the remainder of the process was outsourced to Skyway. Thus Diamond handled the front-office interactions with the customer; the back-office part was outsourced to Skyway. In the redesigned process, a customer places an order on Diamond's Web site. The customer enters order information and credit card information and confirms the order. The order information is then passed immediately to Skyway's Web server, which performs a credit card authorization check. If the credit authorization is approved, the order is sent directly to Skyway's warehouse and availability is confirmed. The order is then picked, packed, and shipped directly to the customer.

This redesigned process requires much process coordination and information exchange among Diamond, Skyway, and other transaction partners. When the order is

shipped, Skyway notifies the bank that issued the customer's credit card about the transaction, and the bank both debits the customer's account and transfers the funds to Diamond. Skyway also periodically sends an update of all Rio transactions that have occurred to Diamond's Oracle ERP system which has an inventory management module. The Diamond inventory management module monitors the level of inventory at Skyway's warehouse. When a minimum level is reached, a replenishment shipment is automatically sent to the warehouse. This seamless ordering and fulfillment coordination between the two enterprises requires IT infrastructures that can be easily integrated together and can support automated interactions and sharing of transaction information.

In-Sourcing: UPS Worldwide Logistics is a global logistics provider for many companies around the world. They manage the logistics portion of the order fulfillment process for their shipping customers and also provide many value-added services that include product testing before they arrive at their destination. They began shipping high-end name-brand Fender guitars from the U.S.A. to Europe. In order to make sure that the pricey guitars arrived with their strings well tuned, they sent them to 20 European distributors for tuning and testing. As outsourcing the testing portion of the process to the distributors proved expensive and slow, they decided to bring that part of the process in-house. They redesigned the process by carrying out the tuning and testing at their warehouse in the Netherlands. In order to insource the process, they hired four rock guitarists with tuning expertise to carry out the process. Fender reports that this redesign will cut costs by 9 percent and delivery time from months to weeks. With an accompanying IT infrastructure and rapid logistics, the combination is powerful. The press reports that the rock group Kiss was scheduled to play a concert on a Saturday night in Hamburg, Germany, and requested a guitar on Friday—it arrived tuned and in time for the concert.

Routing through an Infomediary: Chemdex Corporation is a one-stop virtual shop for enterprises in the Pharmaceuticals and biotechnology industry. Its Web site Chemdex.com enables purchasing managers in that industry to purchase all their chemical supplies. Buyers can search electronic catalogs and order from over 250,000 products sold by 120 suppliers. Chemdex is an aggregator that brings together buyers and sellers in a fragmented industry. It also provides business solutions and software for its customers to help streamline the procurement process. Enterprises can purchase through their own intranets and receive customized options easily integrated into their purchasing process (such as requisition routing and approval, summary billing, and consolidated reporting). Furthermore, Chemdex will help purchasing managers set up prenegotiated discount pricing from suppliers as well as help electronically interface the enterprise's purchasing process into Chemdex's catalog and fulfillment services. Thus an enterprise can redesign and streamline its purchasing process by routing it through an aggregator.

Principle #3: MASS-CUSTOMIZE*Flex the process for any time, any place, any way.***Common Tactics**

- Flex access by expanding the time window for the process.
- Flex access by migrating the physical space in which the process happens.
- Create modular process platforms.
- Push customization to occur closest to the customer.
- Enable dynamic customization of product offerings.

Essence: A process can be redesigned to allow flexibility of interaction options and product offerings for different customer segments. A process that is designed for mass customization delivers unique custom outputs geared to customer preferences with higher quality, in shorter time, and with more flexibility. Mass customization means that the business process is designed to be as efficient as mass production and nearly as responsive to customers as personalization. This is accomplished through a limited set of customization options that a customer can select. A mass-customized process has business rules ensuring that only valid combinations of the attributes of the product or service are allowed.

Flexing Time: Mass-customization can be brought to a process by making its time boundaries more flexible or by changing the time constraints around some parts of the process. A business process that only operates from 8 A.M. to 5 P.M. can be redesigned to extend into a longer evening period, or can be redesigned to be "7 x 24" and operate 24 hours a day and seven days a week. Extending the time window of a process usually adds convenience for the customer of the process, reduces congestion and waiting time, and effectively expands the capacity of the process to handle higher traffic. An extended time window can reach new customer segments and (with remote access through IT) customers in other geographical time zones. For the owners of the process, however, an extended time window may also require hiring more people for extended coverage, enhancing the IT infrastructure, and building more complex coordination around the process. It often requires substantial restructuring of the process.

Self-service through the Web has enabled customers of processes to engage with them at any time. Consumers can wake up in the middle of the night and buy goods through the Internet, triggering an order management process to start executing its transactions. Design engineers can access their component supplier's extranet late in the evening to remotely test their new electronic circuit design with a new chip using the supplier's remote simulation software. The possibilities of anytime engagement are endless, whether in business-to-consumer processes or business-to-business processes.

Extending a time window requires a different way of executing a process and managing the resources around it. Several global computer manufacturers offer 7 x 24 technical service to their large customers via telephone in three 8-hour shifts by taking advantage of different geographical time zones. In the first 8-hour shift, the customer support process is handled by their U.S.A. location when personnel in Asia are still sleeping. In the second 8-hour shift, the telephone calls are transferred to Asia. The third 8-hour shift is handled by the European location, which is just starting its day. This

requires coordination between the three groups and also designing ways to share information across locations into the process.

Changing the time window of a process may also require redesigning other interdependent processes that interact with it. The hotel business provides an illustration for this requirement. Traditionally, in hotels the room check-in and check-out process specifics that check-in time is 3 P.M. and check-out time is 12 noon. Some customer service-oriented hotels are now extending their check-in and check-out times to be any time (similar to car rental companies). However, this requires redesigning the room cleaning process and how it is scheduled as well as redesigning the billing and reservation process to accommodate fractional days. This may require modifying the information systems that support these processes.

Flexing Space: Mass customization can be brought to a business process by creating more options for the physical space in which parts of the process are executed—giving customers a greater array of access options. In e-business the typical migration is to virtualize the customer interaction space to allow the customers or doers of the process to interact with the process remotely through the Internet or phone or private network at their own preferred physical location. Thus the interaction space is brought into their own physical location, whether it be home or office or wherever they are mobile or traveling. Doctors can diagnose patients remotely based on their online X-rays. Students can shift their place of learning to their home or office through videoconferencing and online access. A conference planner selecting a hotel venue for a conference can get a virtual tour of the location through the Internet.

Apart from efficiency and convenience, migrating the physical space can also add value. Sunglass Hut International sells sun glasses in shopping malls. In late 1998 it decided to close 250 of its 2,000 plus physical stores and beef up its online store on the Web so that customers could be better served in their own physical space. They are planning to redesign their sales process online so that Web customers will be able to take a digital image of themselves and download it to the Web site for virtual sunglass "try-ons." Customers can try on various sunglass makes and models to see which ones look best, taking as much time as they like in the privacy of their homes. Similarly, Ford Motor Company uses videoconferencing and the Web in its research and development process to allow participants from any geographical location around the world to collaborate. The company brings together 4,500 engineers from R&D laboratories in the U.S.A., Germany, and England on the Web to collaborate on design projects. Basic auto components are designed once and used everywhere.

Modularity and Dynamic Customization: A process can be restructured for efficient mass-customization by creating a modular architecture for the process that allows different process outcomes to be generated through a common process platform, rather than having unique process paths for each. Thus a modular process design consists of independent modules that can be resequenced easily. A modular architecture makes it possible to efficiently offer a variety of access and product offerings to the customer of the process and to more easily change the variety when new options become available. Let us use the example of a publishing company for catalogs that delivers its products in various media to its customers (hard copy, CD-ROMs, online downloads) and mass-customizes them for its customers' customers. It can modularize its process into three

subprocesses: data gathering, editing and formatting, and distribution. It can carry the first two through a common process platform that is independent of the distribution medium. It can then have several paths for the distribution process, depending on the medium.

A mass-customized process can also be designed for high responsiveness to customer choices. One common tactic is to push the customization as close as possible to the customer (i.e., downstream in the process) so that the process is lean and targeted. For example, in the clothing industry there is an emerging trend to move the customization in the order fulfillment process downstream to the retail store. A customer's measurements are taken at the retail store through computer-based optical technology and then transmitted electronically to the clothing vendor who can often cut and sew the garment within 48 hours.

Another tactic is to build into the process the ability for customers to make online choices for customization options as they interact with the process. Thus customization choices are done dynamically by the customer and trigger a "build-to-order" process for the product or service directly through these choices. The process is designed so that alternative paths or outcomes are selected on demand through the customer. Dell Corporation sells personal computers directly over the Internet. Customers can select their desired personal computer configuration interactively at the Web site through a software-based product configurator. The configurator is a key driver of the mass-customized order management process. It allows customers to make choices (type of processor, size and make of disk drive, monitor, for example) from available options while preserving logical rules (for example, cannot have more plug-in cards than available slots in the chassis). These customization choices trigger a build-to-order process for the personal computer that, depending on the different options, may send messages to different manufacturers to ship the item to Dell for assembly.

Principle #4: SYNCHRONIZE

Synchronize the physical and virtual parts of the process.

Common Tactics

- Match the offerings on the physical and virtual parts of the channel.
- Create common process platforms for physical and electronic processes.
- Track the movement of physical products electronically.

Essence: When an enterprise moves into e-business, it typically does not disband the bricks-and-mortar side of the business. Rather it redesigns its business processes to take advantage of both the physical and electronic parts of the process. Thus a shipping company will have a logistics process that moves the package physically across multiple modes of shipment but also tracks the physical movement electronically through bar codes on the package. Similarly, a retailer will redesign its sales process for online sales through the Internet but will also continue to have customers buy from its physical stores. A process becomes much more effective if its physical and virtual channels work in concert with each other and provide comparable offerings.

Match Offerings: Borders is one of the largest retailers of books and music in the U.S.A. with over 250 stores. Borders started in 1971 as one book shop where customers

could rely on a friendly, well-informed staff to find exactly what they were looking for or browse for hours through shelves stocked with a broad selection of books. A few years ago Borders started selling books online through the Internet at Borders.com, which made their entire inventory available online. Recently, they are starting to install intranet kiosks in their physical stores for customer use so that their entire inventory of books at all physical locations is available to shoppers. They are redesigning their physical channel to be better synchronized with their electronic channels so that customers can browse electronically in their stores. In addition, customers will never leave a store without making a purchase because the book they wanted was not on the shelf.

Common Process Platforms: Many enterprises have seen the value of having common process platforms for both their physical and electronic processes so that they can be mixed and matched by the customer. CVS Corporation is the second largest drug retailer in the U.S.A. with over 400 stores. In 1999 it acquired Soma.com, an upstart Internet-only drug retailer. The acquisition gave CVS an e-business infrastructure with Web-enabled order management and a better warehouse distribution system that moves drugs quickly and expands the channels that touch the customer. This has changed how its physical and electronic processes work together when customers order prescription drugs. Customers can order their prescription drugs electronically through the Web or at the store and then pick them up at the stores or receive them through the mail.

Track Movement: Information technologies can obviously help the synchronization of physical and electronic process paths. In the last decade, bar code readers have been to the tracking of physical movements what optical scanners are to converting hard copy documents to electronic form. It is through bar code readers and optical scanners that the movement of physical objects and paper have been synchronized with electronic parts of the process. Examples are everywhere—whether it is supermarket items moving out of the store at the checkout counter, or packages passing through an intermediate shipping destination with electronic tracking through the Web, or parts moving through a factory assembly process connected to an enterprise resource planning system. Emerging technologies for tracking movement include smart tags made with electronic chips with antennas that respond to radio signals as well as tags that transmit exact geographical location to satellites. All these technologies enable automated coordination between the physical and electronic parts of a business process.

Principles and Tactics for Changing Information Flows around the Process (Informate It)

Principle #5: DIGITIZE AND PROPAGATE

Capture information digitally at the source and propagate it throughout the process.

Common Tactics

- Shift the data entry to customers and digitize it.
- Make the process as paperless as possible as early as you can.
- Make information more easily accessible upstream and downstream to those who need it.
- Shrink the distance between the information and the decision.

Essence: A business process can be redesigned by modifying the information flows around it so that information is captured as early as possible in digital electronic form. This enables the information to be propagated easily throughout the process, eliminates repetitive human effort and errors, and shortens process cycle time. It also enables the process to take better advantage of the information when decisions need to be made throughout the process. Once information is digitized in electronic form, software can enable added functionality for the process.

Digitize at Source: Capturing the information as early as possible and digitizing it as close as possible to the source makes for more effective propagation of the information up and down the process. Shifting data entry to customers of the process through self-service on the Web is a common way to accomplish this. Customers who buy products online can enter information directly in electronic form. The software will recognize the customer the next time he or she visits the Web site and will trigger the ordering process, thus removing the need for the customer to reenter information. To facilitate entering customer information in online shopping across multiple companies, a variety of credit card companies, software companies, and third-party providers are promoting electronic wallets. Electronic wallets are based on software that stores and manages personal data and eliminates the need to retype credit card information, addresses, and other personal information each time a customer wants to make an online purchase. The emerging generation of e-wallets automatically feeds customer information into the electronic payment forms of participating merchants and includes security features as well. Customer information can then be propagated across the order management process much more easily for all enterprises in the supply chain, while making the process more efficient for the customer.

Make It Paperless: Making the process as paperless as possible is another common tactic. The redesign of the recruiting and hiring process at Microsoft Corporation provides an illustration. Microsoft receives an average of 750 resumes from job applicants every day. In 1997 only 6 percent of the resumes were submitted electronically through the Web or through e-mail; in 1999 70 percent of the resumes were being submitted electronically. Microsoft has redesigned the process so that resume information capture and scanning of resumes for required skills and experiences is automated.

The front end of the process is automated no matter what medium the resume is submitted in. Paper resumes submitted through postal mail are optically scanned and converted into electronic text and then fed into a structured recruiting database. Resumes submitted through e-mail must be in standard ASCII text form and are parsed and fed into the structured electronic database. The Microsoft Jobs Web site at www.microsoft.com/jobs has resume-building software that allows an applicant to build a resume online using a structured form, which then directly feeds the information into the recruiting database. The Web site also has current job listings categorized by job category (product development, sales), by product (Windows 2000, PowerPoint), and by job title (software developer, consultant) allowing prospective applicants to search for the jobs they are interested in and indicate their preference when they build and submit their resumes. All submitted resumes are scanned through software for key words, and applicant skills are matched with open job positions within 48 hours of receipt. The front end of the process is highly automated and saves much human effort that would have gone into eyeballing undifferentiated resumes.

Making it paperless enables the rest of the process to be carried out differently. Human resource specialists can quickly forward resumes for promising candidates to hiring managers over e-mail wherever they are in the world. If a job candidate is invited to a company location for a face-to-face interview, interviewers can share information electronically in real time, allowing one interviewer to build on another's work like an intelligent relay race. It becomes a more efficient and effective recruiting process.

Make Information Accessible Upstream and Downstream: When information is in electronic form, it can easily be made available to those who need it throughout the business process. In a supply chain process much status information is needed for coordination between suppliers and business customers. The order management process is a typical process that can benefit from electronic information that can be propagated up and down the supply chain. For example, Procter & Gamble provides many household items and consumer goods to the giant retailer Wal-Mart. Wal-Mart and Procter & Gamble (P&G) use Electronic Data Interchange (EDI) in the order management process so that P&G can monitor Wal-Mart's P&G product inventory continuously and know when to replenish it based on actual sales. Information for sales figures, inventory levels, and price information are fed electronically and in real time to P&G from each Wal-Mart store. P&G uses this information to determine the amount of P&G product required and automatically ships the merchandise from the factory to the specific store without Wal-Mart having to prompt it. This makes for a leaner response order management process with very different physical flows. Information movement changes the way that inventory is moved.

Shrink the Distance between the Information and the Decision: Processes can be executed much faster by redesigning the information capture and access around a process so that information needed for decisions in the process is directly accessible. The closer the information is to the point of decision (in terms of directness of access rather than physical distance) the more efficiently the process can be executed. In 1994 the Swedish police redesigned the process by which they issued passports to Swedish citizens in order to speed it up. Originally a Swede who wanted to get a passport would submit a completed application form at the local police station together with a paper birth certificate obtained from the local church. Applications would then be forwarded in batches to a regional passport processing location that would check public records for any criminal record or abnormalities. Passports would then be issued and sent back to the local police stations in batches, which would in turn mail notices to the citizens to go and pick up their passport. The process took about four weeks. The newly redesigned process has cut that time to six minutes while also halving the cost of the process. The Swedish police connected each police station via computer terminals to all data sources needed for checking an applicant's background and issuing a passport. The data are now all in electronic form, including birth certificate information. The process was redesigned with these new information flows so that the decision to issue a passport could be done on the spot at the local police station. No paperwork is sent to a central location, no trip is needed to get a birth certificate, and no notices are sent in the mail. The passport can also be issued at any police station very quickly. Different controls on the process have been put in place to ensure that the process is not abused by citizens.

Principle #6: VITRIFY

Provide glass-like visibility through fresher and richer information about process status.

Common Tactics

- Provide on-demand tracking information for customers of the process.
- Provide reporting capabilities that provide on-the-fly analysis.
- Design standard partner interface processes for seamless exchange of information.

Essence: Vitrium is the Latin word for glass. To vitrify is to make something as transparent as glass. A business process can be redesigned by improving its transparency and real-time visibility while it is in progress through fresher and richer information. This is achieved by providing fresher and richer tracking information about the progress of the process as it is being executed. Real-time visibility is what every customer and process owner would like, but it is expensive and not easy to accomplish both from a business and technology integration perspective. It is, however, becoming increasingly doable and expected in the world of e-business.

Enhanced process visibility typically improves customer satisfaction through a better sense of control. Visibility also provides more opportunities for corrective actions (often in other related processes) based on rapid feedback about process progress. It also enables better process management for processes that are shared across multiple enterprises. Enhanced visibility across enterprises typically requires seamless IT infrastructures that can easily pass information and provide good access to those who need it.

Example: Taiwan Semiconductor Manufacturing Company (TSMC) is the largest contract foundry for integrated circuits in the world. Headquartered in Taiwan, it has large business customers in other countries in Asia, the United States, and Europe. It fabricates integrated circuit chips on contract for semiconductor companies and integrated device manufacturers who do not have foundries of their own (so-called fabless). A customer provides TSMC with an integrated circuit design, and TSMC fabricates the chips, tests them, assembles the integrated circuits, and ships them to the customer's sites. It is a turnkey manufacturing process that is off-site for its customers who are often halfway around the world. TSMC wanted to redesign this manufacturing process for its customers by enhancing the visibility of the process to provide the same level of information richness as in-house manufacturing managers could provide to their own shipping department and also to reduce lead times. TSMC wanted their customers to view them as a virtual manufacturing facility that was well integrated into their core business processes rather than a distant contract manufacturer. TSMC also wanted the information exchange to be reciprocal so that customers would provide enhanced visibility for TSMC into their design process.

Initially the interaction between the TSMC manufacturing process and their customers was slow, error-prone, awkward, and provided little process visibility for their customers. TSMC had to extract customer order status information from their computer system, convert it into desired customer format for 400 different customers, and then share it through fax, e-mail, or EDI. TSMC then implemented a self-service Web site

where customers could access TSMC's internal manufacturing information. The self-service Web site did not solve the visibility problem effectively as it just shifted the burden onto the customer. The customer had to search the Web site, download the information, and then reformat or rekey that information into their own systems. Furthermore, it reduced two-way customer interaction with TSMC and made it more difficult for TSMC to obtain forecasting and related order information from their customers.

TSMC then found a software solution that would link their enterprise systems with their customers' enterprise systems, thus automating the information sharing across enterprises. This software solution enabled customers to get the status information at any time in the form they wanted. It also could push the information directly from TSMC into the customers' enterprise system whenever TSMC needed to. The customer sends prototype specifications to TSMC through the software; test results are returned to the customer; the design is modified and resent to TSMC. This process is repeated with frequent interactions and visibility for both enterprises. Finalized designs, drawings, and specifications are then bundled with purchase orders and automatically sent to TSMC for fabrication. Frequent work-in-progress updates are automatically sent from TSMC to its customer in the format that it needs. Notification about production orders that are completed is sent to customers and they in turn notify their own customers. TSMC ships directly to their customers' customers and automatically provides shipping notification. The increased visibility allows problems to be identified early and corrected quickly. This has increased customer satisfaction and enabled a process redesign with shorter cycle times.

Principle #7: SENSITIZE

Fit the process with vigilant sensors and feedback loops that can prompt action,

Common Tactics

- Build in customer feedback loops to detect process dysfunctions.
- Enable software smarts to trigger quick business reflexes.
- Attach environmental probes to the process to monitor change.

Essence: A process can be redesigned to be more sensitive to changes that require action. This is accomplished by building in feedback loops that easily allow the customers of the process to provide feedback on how well the process is working, which can be very useful information for improving the business process. A process can also be designed to detect changes in the external environment that affect the outcomes of the process. Software is often used to detect exceptions quickly and to alert the doers of the process if their action is needed.

Process Dysfunction Loops: A process can be designed to be more sensitive to customer feedback by building in information feedback loops that can easily capture customer input about any dysfunctions in the process so that corrective action can be taken. In e-business, this can include online electronic forms that allow structured input by customers of the process that is then routed to the process owners for action. It can also include click-to-talk paths through technologies that let customers of the process click on a button at a Web site to establish voice communication with process participants.

Monitor Environmental Change: Hertz Corporation is one of the largest car rental companies in the world. The pricing process for determining the rental rates for cars is

designed to quickly and proactively detect price changes by competing car rental companies. This vigilant sensing of competitors' pricing is critical in the car rental business where profits depend highly on responding quickly when market conditions change. Hertz makes about 50,000 price changes every week across its multiple locations and car categories. Hertz uses intelligent agent software that scans car rental pricing data uploaded from travel reservation databases and looks for predetermined pricing changes in competitors' pricing structures. The pricing process is designed to flag the pricing manager when competitor prices exceed preset variations so that pricing action can be taken quickly.

3-2-3: Principles and Tactics for Changing Knowledge Management around the Process (Mind It)

This next set of process redesign principles and associated tactics relate to changing the knowledge management capabilities of the process by harnessing the collective intellectual assets around it. These principles and tactics enable the knowledge-creation capacity of a business process to expand. The process is redesigned to have more smarts and to have a "mind" of its own. Knowledge management around a process implies taking advantage of collective expertise to intelligently create, capture, deploy, share, preserve, and reuse knowledge. Business processes that have expanded knowledge-creating capabilities enable faster learning.

Principle #8: ANALYZE AND SYNTHESIZE

Augment the interactive analysis and synthesis capabilities around a process to generate value added.

Common Tactics

- Provide "what-if" capabilities to analyze decision options.
- Provide "slice and dice" data analysis capabilities that detect patterns.
- Provide intelligent integration capabilities across multiple information sources.

Essence: A business process can be redesigned by adding analysis capabilities through software and intelligent information feeds that generate knowledge that can become a major part of the deliverable to the customer of the process. Both the executors and the customers of the process become more knowledgeable and enable better outcomes for the process. This tactic is especially applicable in knowledge-intensive processes where the value proposition to the customers of the process is increasingly based on providing good advice to customers and improving customer capacity to make intelligent decisions that they are comfortable with. This tactic is especially powerful in the provision of complex products and services.

Example: Merrill Lynch provides full-service financial brokerage services to 5 million customers with a total of more than \$ 1 trillion in customer investments. A full-service brokerage firm provides financial advice and investment **handholding** for customers in addition to executing financial and brokerage transactions for their accounts. Merrill Lynch was under pressure from low-cost flat-fee discount brokerages such as Schwab & Co. and

Internet trading upstarts such as E*Trade who were increasingly providing customer access to investment information through the Internet. It needed to better leverage its skilled financial consultants to provide better full-service value to its customers. Merrill Lynch redesigned its service delivery process by beefing up the analysis and information feed capabilities around it to benefit the financial consultants.

The information feeds around the service delivery process were inefficient. Merrill Lynch's financial consultants were spending too much time searching for information (research reports, market data, customer account data). The information was on different computer systems that in many cases were incompatible and not easy to use, often requiring several computer terminals on a financial consultant's desk. Consequently, the financial consultants had less time to spend on providing financial advice to their customers. Furthermore, the analysis capabilities to measure the performance of clients' portfolios against their financial goals were limited. A financial consultant had to run many individual independent "what-if" analyses for investment options to find corrective actions. Even though the analyses were computer-based, they were not easily linked together, especially when a client had multiple accounts.

In late 1998 Merrill Lynch implemented their Trusted Global Advisor system, a new IT infrastructure and application system that boosts intuitive information feeds and analysis capabilities for Merrill Lynch's 17,000 financial consultants around the world. Multiple information feeds from varied computer systems, databases, and media are logically organized into one easy-to-interpret intuitive interface. The IT infrastructure enables the feeds to come from a variety of systems and media, whether they are from internal legacy mainframe databases, client-server applications or Web browser applications, real-time feeds from stock exchanges, e-mail, CNN live TV broadcasts or Webcasts. The information feeds can be customized by each financial consultant according to his or her preferences. Several information feeds can be viewed simultaneously on one screen. The Trusted Global Advisor system also enables a financial consultant to run "what-if" analyses on a client's portfolio with several variables and see all the results graphically on one screen in an integrated fashion, making it much easier to know which choices are best for the client's financial goals. The financial consultant is more easily and efficiently informed and has better knowledge for advising the customer. The process adds more value for the customers and also gives the financial analyst more time to spend advising customers and building stronger relationships.

The benefits of such a redesign principle do not end there. Merrill Lynch also created a version of the Trusted Global Advisor system for direct use by its customers, called Merrill Lynch Online. This system gives customers online access to information about financial markets and research reports. It also allows customers to carry out transactional processes such as funds transfer and bill payment. Furthermore, it allows customers to dialogue with their financial advisors through e-mail. Customers are better informed and able to ask better questions when they interact with the financial consultants, further improving the process.

Principle #9: CONNECT, COLLECT, AND CREATE*Grow intelligently reusable knowledge around the process through all who touch it.***Common Tactics**

- Create a community of practice around the process.
- Create expertise maps and "yellow pages" related to the process.
- Build knowledge repositories that can be reused to enhance the performance of the process.
- Develop a FAQ (Frequently Asked Questions) database through the doers of the process.
- Embed knowledge-sharing spaces for interactive dialogues around the process.

Essence: A business process can be redesigned by intelligently growing knowledge around it through all the people who take part in the process, whether they are the doers of the process or the customers of the process. Superior executions of the process are identified and best practices and tips shared so that subsequent executions are improved. Eventually, this learning can be used to further change the design of the process.

A knowledge management infrastructure can be viewed as having three aspects: a "connect" aspect, a "collect" aspect, and a "create" aspect. The connect aspect includes ways of mapping connections to sources of expertise and specific knowledge. This is often done in a yellow pages format that lists sources of expertise around a process (say new product development or customer service) sorted by topic and issue rather than by job function or job title. It often includes sources of expertise (whether people, organizations, or documents) that are outside the enterprise. It is typically augmented through knowledge-mapping software that allows search and cross-referencing.

The collect aspect of a knowledge management infrastructure includes ways of capturing and organizing knowledge so that it can be intelligently reused. This is done by setting up procedures through which knowledge can be captured, classified, filtered, and synthesized in meaningful ways that are directly relevant to the business process and can add value to its execution. The structure of such a knowledge base can be a traditional document database that is indexed by topic; or it can be a frequently asked questions database that is organized in a question-and-answer format; or it can be a discussion database that has threaded comments by multiple participants on a particular topic.

The create aspect of a knowledge management infrastructure involves setting up technological platforms, institutional forms, and physical or virtual spaces for shared knowledge creation. It allows the people who are involved with the process to exchange knowledge and jointly create it through informal conversations and ad hoc exchanges that contribute to expertise needed around a process, whether to execute it, reconfigure it, or improve it. Enterprises that encourage such knowledge sharing typically provide institutional mechanisms that provide incentives for sharing and exchanging knowledge rather than hoarding it. Sometimes self-organized groups (called communities of practice) form among employees in the same enterprise or across several enterprises because they share common work practices or professional interests. Focusing communities of practice around a particular business process can expand the knowledge-creating capacity of that process.

A successful knowledge management infrastructure needs to have all three connect, collect, and create aspects. Together they provide complementary ways of growing collective expertise around a business process so that it adds value to the process. Business processes can be redesigned by changing the way that these three aspects are implemented around the business process. Growing knowledge around a business process enables knowledge to be reused to speed up the execution of the process, to add value to the outcomes of the process, or to provide insights for redesigning the process.

Example: Daimler-Chrysler was formed in 1998 between two of the largest automotive companies in the world, Daimler-Benz in Germany and Chrysler Corporation in the U.S.A. In the early 1990s Chrysler reengineered their design and engineering process for building cars. They implemented a platform approach for building cars in which teams of engineers focused on a single type of car platform (small car, truck, large car, sports utility vehicle), working on new models as a system from concept to production. This was a demarcation from traditional automotive industry practices in which work was organized around functional "stovepipes" (design, engineering, manufacturing, marketing) and around components (engine, body, power train). The first car model produced with this platform approach went from concept to production in 39 months instead of 50 months and cut nearly a year from the process execution time.

However, the reorganization of the design and engineering process along car platforms brought with it some unintended consequences in terms of the distribution and sharing of expertise around the process. Design errors started to appear more frequently in car designs; it was as though Chrysler had a memory problem and was forgetting its own practices and procedures for designing and building cars. They soon realized that when they reorganized to platforms, they disintegrated core technical groups who collectively knew about engines, for example, and no longer had the same critical mass of peers for sharing information and knowledge. While the process had speeded up and produced many advantages, the knowledge-creating capacity of the design process had been diminished through the platform approach. The new process could be improved by rethinking how knowledge management was organized around it.

In 1996 Chrysler made knowledge management a vital priority for its design and engineering process and redesigned the process based on rethinking the virtual and physical networks of knowledge around it. By 1999 it was a faster and higher-quality process with much shared knowledge creation and reuse. At its heart is a knowledge repository that encompasses best practices in the design and engineering of cars, called EBOK, the Engineering Book of Knowledge. EBOK is an interactive electronic repository accessed through an intranet with a browser interface. Chrysler has instituted incentives and procedures for taking best practices, refining them, and entering them into EBOK.

The knowledge base draws from various databases that include product data management systems, CAD/CAM systems, supply and procurement databases, and vehicle test data. Designers and engineers can search EBOK through various indexes; EBOK also allows dialogue and discussion through a Web browser interface that runs software from grapeVINE Technologies as a Notes/Domino application. Designers and engineers can react with electronic sticky notes to an author, who then either needs to respond to the comments and bolster their point or make changes to the entry based on the comment. These messages also go to the overseer of the EBOK chapter for this

issue or area who decides how to modify the entry. This provides a rich and fertile knowledge around the design process and builds the know-how around it. EBOK is now part of the company's official design review process. Furthermore, when an update in EBOK occurs, it is sent to various designers and engineers based on their stored interest profile, further enhancing the connect features of the knowledge management infrastructure around the process.

The use of EBOK is integrated with the design and engineering process in such a way that the knowledge is intelligently reusable and does not inundate engineers with undifferentiated information. An engineer can selectively find the best practice for his or her particular section of the automobile that includes what the customer requirements are, who the suppliers are for the parts and what their history and comparative performance have been, what competitors are doing, and other pertinent information. Similarly, the knowledge that is entered into EBOK's knowledge repository is focused on issues that directly impact the design and engineering process. Reusability of pertinent knowledge and quick access to best practices that are constantly evolving really helps catch errors and omissions early and makes for better and faster car design.

Chrysler has institutionalized knowledge sharing and collaboration within platform teams as part of the corporate culture. They have also encouraged the creation of Tech Clubs to foster knowledge sharing across platforms. Tech Clubs are functionally organized communities of practice that reunite designers and engineers with others in the same area of functional expertise from other platform groups. The Tech Clubs hold regular social gatherings for sharing ideas and mentoring around the design and engineering process. The Tech Clubs are also the formal body that govern EBOK policies and assign authors, editors, and reviewers for EBOK. Currently there are seven Tech Clubs in the main areas of body, chassis, advanced engineering, electronics, interior, power train, and vehicle developments. There are also 120 Sub Tech Clubs that are further specialized. Membership varies from 10 to 450 people. EBOK's collection of best practices and technical know-how around the design and engineering process is created, shared, and maintained by these communities of practice.

Chrysler has also been working with its suppliers to integrate them into EBOK, but is still wrestling with issues of culture, liability, and security. Currently, supplier entries have to be approved by the Tech Clubs before a Chrysler EBOK section sponsor can enter the information into the knowledge base. Chrysler is working hard to redesign the process to take better advantage of the expertise of the numerous suppliers who touch the process.

Example: Smaller enterprises with less technological sophistication can also redesign their business processes through changing the way that reusable knowledge is grown around them. The Maritz Performance Improvement Company consists of about 2,000 employees and designs customized performance improvement programs for its clients in areas such as incentives, quality, and customer satisfaction. They employ about 160 salespeople who market and sell Maritz's services. Maritz redesigned part of the front end of their sales and marketing process to increase sales by enhancing the knowledge-sharing capabilities around it through some simple but powerful ways. They redesigned the presales process around an intranet application called "Let's Talk." It consists of three primary repositories for enhancing knowledge-sharing capabilities: an electronic filing cabinet with service guides, brochures, and sales presentations; a

repository of case histories; and business biographies of company employees that include previous client engagements.

With the help of "Let's Talk," the presales process is a much more knowledge-enriched process. The salesperson starts by consulting the service guide, which is a comprehensive collection of electronic textual information about a particular service. The service guide has replaced paper-based product kits that are often outdated. It also includes a testing facility with frequently asked questions around the service. Each salesperson is asked to read each question out loud and verbally respond until he or she is comfortable with their ability to answer the question. They can double-click the question at any time and read how a seasoned expert answered it. As soon as the salesperson is comfortable with the service concept, they can check to see which brochures are available to give to clients and print the ones they want. The next step for the salesperson is to customize the service pitch to fit client needs and prepare a presentation to sell to those needs. The presentations are designed so that about 75 percent of the presentation will be a standard pitch and reused, whereas the remaining 25 percent will be client personalized. The presentations have split screen formats with post mortem analysis, tips, and commentary from other salespeople who have used it, enabling the salespeople to learn from others' experiences in preparing presentations for their clients. After completing the presentation, the salesperson can append some case histories through the intranet. The case history repository has summaries of client case histories related to a particular Maritz service, enabling the salesperson to respond to clients when they ask "Has anyone else done this?" From the biography repository the salesperson can also add the business biographies of all employees who will work on the project to showcase it to the client. After the sales presentation, salespeople are required to update the intranet with what they have learned from their client; the learning is shared for the next client project.

Principle #10: PERSONALIZE

Make the process intimate with the preferences and habits of participants.

Common Tactics

- Learn preferences of customers and doers of the process through profiling.
- Insert business rules in process that are triggered based on dynamic personal profile.
- Use automatic collaborative filtering techniques.
- Keep track of personal process execution habits.

Essence: A business process can be redesigned by increasing its capabilities to learn about the preferences and habits of the customers and doers of the process. A knowledge base with customer profiles and preferences is built based on repeat executions of the process. The knowledge about preferences is then used in subsequent process executions to make the outcomes of the process more personalized to the customer or doer of the process. Taking advantage of this knowledge can add value to the process participants and speed up the process on subsequent executions. This knowledge can also be used to provide new process offerings and to redesign the process.

Examples: Ritz-Carlton Hotels is a worldwide five-star hotel chain with an excellent reputation for personalized customer service. Its customer service process includes

institutionalized ways of learning about the preferences of its customers through profiling and using that knowledge on subsequent customer service instances to tailor and personalize the service offerings. Ritz-Carlton trains all its service employees to record every preference or complaint that they can pick up from conversations with or observations of individual customers. Each employee (whether on the front desk, housekeeping, or maintenance) is provided with a guest preference pad for writing down these preferences. Preferences are entered into a profile database that can be accessed worldwide through the COVIA travel reservation system. Currently, Ritz-Carlton has individual profiles on half a million guests. The customer service process can then be tailored to individual preferences based on this knowledge. When the customer service process is initiated for a repeat customer at any hotel location, the process remembers and personalizes the offerings.

In e-business contexts, the customer's habits can also be used to automatically trigger business rules through software. American Airlines' frequent flyer program uses software from BroadVision in its booking process. The software creates an individual profile of home airport, usual routes, seating, and meal preferences that streamlines the booking process through personalization. RS Components, a global distributor of electronic and industrial supplies, uses similar software for its business-to-business customers in their purchasing process through the Web. The process can be personalized to appear as though all customers have their own personal sales agent. The software enables the use of personalized business rules such as "if the customer is a purchasing manager from Company X, show pricing schedule based on volume of purchases the manager made in the last year."

Automated collaborative filtering is a software-based technique that is increasingly used to amplify the knowledge-creating capability of e-business processes. Barnes & Noble is one of the largest booksellers that sells books on the Web. Its sales process through the Web uses collaborative filtering software from Firefly to generate additional sales and value added for the customer. A customer profile is established, and the software matches it with similar customer profiles using statistical association techniques. It can then make personalized book recommendations by taking advantage of the purchasing data to inform the customer that "people who bought Book X that you are inquiring about also bought Books V, W, and Z."

These personalization techniques can also be used with the doers of the process, rather than just its customers.

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HOW TO REDESIGN ENTERPRISE PROCESSES WITH BPR SOFTWARE

Part A of the book has provided a general understanding of the concepts and issues of BPR in the context of e-business. Part B provides a step-by-step progression of how to redesign enterprise processes with BPR software. Part B takes advantage of the Workflow.BPR software from Holosofx that comes on CD-ROM with the book. The three phases of business process redesign outlined in Chapter 1 are covered in detail using examples at both the enterprise level and the supply chain level. The mapping of the three phases into the chapters is shown in Table B-1 below.

TABLE B-1

Mapping the 3 phases of process redesign with Part B chapters	Phase 1 Scoping the process	Phase 2 Modeling, analysis, & redesign of process	Phase 3 Planning process integration
Enterprise-Level Business Process	Chapter 4	Chapters 5, 6	Chapter 8
Supply Chain-Level Business Process	Chapter 7	Chapter 7	Chapter 8

4

SCOPING AN ENTERPRISE PROCESS

- 4-0: READY TO LAUNCH
- 4-1: OPERATIONALIZE PROCESS PERFORMANCE TARGETS
- 4-2: DEFINE PROCESS BOUNDARIES
- 4-3: IDENTIFY KEY PROCESS ISSUES
- 4-4: UNDERSTAND KNOWN BEST PRACTICES AND DEFINE INITIAL VISIONS
- 4-5: FAMILIARIZE PARTICIPANTS WITH BPR SOFTWARE
- 4-6: OUTLINE DATA COLLECTION PLAN AND COLLECT BASELINE DATA
- 4-7: PROCESS SCOPING REPORT

WHAT CHAPTER 4 IS ABOUT

This chapter outlines the typical steps that have to be done in the Scoping phase of enterprise process redesign with BPR software. It assumes that the BPR project has been identified and the process selected, a design team that has been mobilized, and a BPR software tool has been selected. The chapter tells you what typically goes on during this phase and shows you with the help of a case study (Paloma Bank) how to carry out the various activities in order to produce the necessary deliverables for this phase. It assumes you have read Chapters 1 and 2.

4-0: READY TO LAUNCH?

Chapter 1 outlined the five phases of BPR in-the-BIG (see Figure 1-5). It also zoomed in on the Process Redesign phase ("Big" Phase III in that same figure), which is the

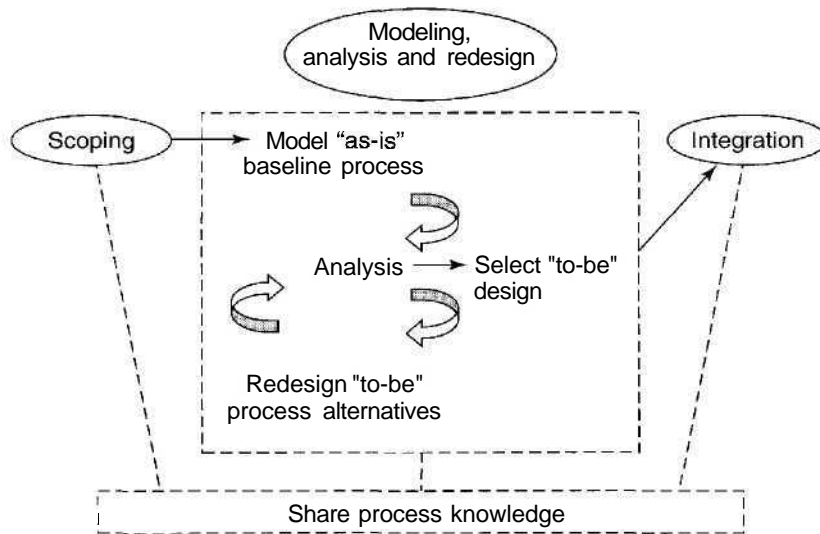


FIGURE 4-1 Phases of business process redesign with BPR software

focus of this book, and divided that into three phases (see Figure 1-7). In this chapter, we start our journey of learning how to go about doing the steps in each of these three phases of process reengineering, and we start off with Phase 1: Scoping the Process (see Figure 4-1 above and Table 4-1).

Scenario: You are a participant in a BPR project and part of the Process Reengineering team. The BPR project has been identified and the process selected, a BPR software tool has been chosen, and your team is mobilized and ready to move and start Phase 1. What are the steps you need to do and what do you need to know? We will use a case study of a BPR project at Paloma Bank to illustrate and explain the key steps you need to carry out and how.

Is It a Strictly Sequential Set of Steps? No! The steps have numbers that depict their typical sequence, but there can be overlap among the steps and some of the steps can be done in parallel. Doing some of the steps in parallel speeds up the process and eliminates some wait times. For example, familiarizing the BPR participants with the capabilities of the BPR software can be done in parallel with other steps, and some of the data collection can be initiated as other steps are carried out. A disciplined BPR team with a good team leader will complete this phase quickly through good coordination. Depending on the size of the BPR project and the messiness of the organizational context, the elapsed time for this phase should be somewhere between a few days and a few weeks for a well-managed project.

Paloma Bank

Corporate Profile: Paloma Bank is a regional bank in the Southwestern U.S.A. that operates principally in California, Nevada, and Arizona. The Bank serves 1.1 mil-

TABLE 4-1 KEY PHASES & ACTIVITIES IN BUSINESS PROCESS REDESIGN WITH BPR SOFTWARE

Phase 1 scoping the process	Phase 2 modeling, analysis, and redesign of the process	Phase 3 planning process integration
Activities		
<ul style="list-style-type: none"> • Operationalize process performance targets • Define process boundaries • Identify key process issues • Understand best practices and define initial visions • Familiarize participants with BPR software • Outline data collection plan and collect baseline data • Plan for modeling phase 	<ul style="list-style-type: none"> • Continue data collection • Model "As-Is" baseline process • Analyze and diagnose "As-Is" process • Design and model "To-Be" process alternatives • Analyze "To-Be" process alternatives and select best alternative • Plan process integration phase 	<ul style="list-style-type: none"> • Examine alternative IT integration options ➤ Adjust process design ➤ Plan for process implementation
Deliverables		
<ul style="list-style-type: none"> • Process scoping report 	<ul style="list-style-type: none"> • Software-based process model • Process reengineering report 	<ul style="list-style-type: none"> • Process integration plan
Key participants		
<ul style="list-style-type: none"> • Process owners and partners • Customers of process • BPR team 	<ul style="list-style-type: none"> • Process participants • BPR team 	<ul style="list-style-type: none"> • IS design team • BPR team

lion individuals and approximately 105,000 corporate and institutional customers and has \$37 billion in assets. It provides a full array of consumer, commercial, corporate, and retail banking services. The bank has a total of 309 offices in 132 communities in the three home states and employs 12,000 employees worldwide. Strategic alliances with leading financial institutions in other nations enable Paloma to enhance services worldwide for customers involved in global manufacturing and trade. With a broad array of high-caliber services and emphasis on long-term customer relationships, Paloma Bank ranks among the top corporate banks in the U.S.A. It has produced long-term profitable growth while adapting to change and maintaining its core philosophy of operating in a sound and prudent manner. It has been rated as one of the top 20 safest banks in North America. At the same time, Paloma has pioneered a number of banking innovations for adjustable mortgages and credit cards that have become industry standards. Paloma has a firm foundation in banking technology and

maintains a state-of-the-art facility in Carlsbad, California, which serves as a hub for Paloma's computer and operations-related steps. Complementing this major center is a network of regional bank processing centers in the three home states.

BPR Triggers: Paloma Bank has embarked on a BPR Project in its Research and Adjustments area. It has identified the Research and Adjustments (R&A) process as the targeted process to be reengineered. The R&A process is the process that corrects imbalances and errors in the item processing stream of financial transactions with the bank (errors in encoding checks, deposit slip errors, adjustments for discrepancies in deposits and withdrawals, for example). The R&A process includes both research for identifying the source of the imbalance or error and making the necessary adjustments to correct it, if needed.

The triggers for the BPR project were as follows:

1. In 1996 Paloma Bank consolidated its decentralized check processing and R&A centers into one processing center in Carlsbad, California. The move was to save on overhead costs and eliminate unnecessary redundancies. Unfortunately, many of their skilled employees in the R&A area did not want to relocate from Arizona or Nevada. The bank was forced to hire locally and the skill level in the R&A area dropped, resulting in very high training costs, decreased efficiency, and a jump in charges that had to be written off by the bank because they could not be resolved in a timely manner. The bank's top management had estimated that at least \$20 million could be saved by removing some of the basic problems in the R&A process.
2. The bank's business customers (companies, corresponding banks) and the bank's branches were becoming more demanding in terms of quality of service and turnaround time. The increased response time was starting to trigger complaints at a bank that was known for excellent customer service.
3. Paloma Bank had started to implement high-speed checking imaging technology in some areas of the bank in order to better serve its customers and wanted to extend that technology to the R&A process. The new Paloma system delivered a CD-ROM with electronic check images to commercial customers at the end of periodic accounting cycles with an intelligent search engine that could accept additional customer data as search criteria for retrieving a check image through workstations. The check images—front and back—could be magnified for viewing, copied to another application (such as word processing or a spreadsheet) faxed, or printed. Linking this new technology to the R&A process was seen as a strategic opportunity.

OPERATIONALIZE PROCESS PERFORMANCE TARGETS

The BPR team needs to carefully understand the stated BPR goals and objectives as defined and developed by the BPR project sponsors and the process owners in the earlier two phases of BPR in-the-Big. These stated goals need to be operationalized into *concrete process performance targets*. *Tangible measures* must be defined for each process target. These tangible measures must be agreed upon by the BPR project sponsors, process owners, and BPR project team and documented and communicated clearly.

Why is this important?

- Fuzzy goals are made concrete and misunderstandings about goals are cleared up before the process redesign begins. A consensus on targets focuses the efforts of the BPR participants.
- It clearly defines what constitutes success of the BPR effort. How will you be able to tell how successful the BPR effort was if you do not have concrete agreed-upon objective performance measures for comparison?
- What gets measured gets done!
- It provides an alerting mechanism when a BPR project has too many process performance targets that are conflicting or not prioritized.

How easy is operationalization of goals into process performance targets?

The less well-developed and less specific the BPR project goals are, the more difficult it is to carry out this step—and the more important it becomes. For example, if the goal of the BPR effort was given to the BPR team as "increasing the quality of customer service," there is much operationalization to be done. Does that mean a faster response time? How much faster? For which types of customers? For which types of services? Or does that mean making sure that 100 percent of all problems are followed up to completion? Or that customers only have to deal with one person rather than be passed from one to another? Or that a customer's record can be accessed in under one second after the customer phones in their customer number?

On the other hand, if the goal of the BPR project is defined as cutting processing time for simple requests from five days average to 24 hours maximum and for complicated requests from ten days average to 90 percent of requests being processed in less than three days, then much of the operationalization is already done.

Should the initial process performance targets or constraints be set in concrete?

No! As the project progresses it may become apparent that initial targets were unreasonable and need to be revised. Furthermore, additional process performance dimensions of importance to this particular BPR effort may emerge through the redesign effort. Any such revisions need to be documented in the redesign diary with a note explaining why the process performance target was changed. This will usually require negotiation with process owners and project sponsors. As for constraints, it is an important function of a BPR effort to constantly question them.

How can this step be done?

The BPR team can accomplish this step through a group meeting followed up with possible interactions with process owners and process sponsors to clear up ambiguities or understand trade-offs and priorities. This step must be carefully coordinated by the BPR team leader.

The mechanics of this step are as follows:

- List the stated goals of the BPR project in order of priority (and flag critical ones).
- For each goal, identify the related process performance targets in specific concrete terms (to the extent possible) and write it out.
- For each process performance target, identify tangible explicit measures and write them out.

- Group process performance targets by type (cycle time, cost) and flag critical measures.

- Identify and list major resource constraints related to the work environment of the process (must use a particular in-house computer system, must be done with 60 people maximum). These constraints can have the same effect as goals in defining performance targets.

An example of a template to help structure the deliverable of this step is included (these templates are also included on the CD-ROM). The template includes several types of process performance targets as a check list. It is followed by an example from Paloma Bank.

Process Redesign Targets

Baseline "**as-is**" process

"To-be" process



.....

Processname:

Process redesign goals	Priority
1.	
2.	
3.	



Process performance targets	Measures
1. Cycle time targets	•
2. Cost targets	•
3. Quality targets	•
4. Knowledge creation targets	•
5.	•



Binding management decisions
1.
2.
3.

Process Redesign Targets

Paloma Bank



Baseline "**as-is**" process

"To-be" process

Process name: Research and adjustments process

Process redesign goals	Priority
1. Cut costs of error write-offs by \$20 million	High
2. Reduce processing time of R&A customer requests	High
3. Improve quality of photocopied checks	Medium



Process performance targets	Measures
1. Cycle time targets: Reduction of turnaround time for R&A request to be 72 hours	<ul style="list-style-type: none"> Median resolution time for R&A requests by type of problem (target 36 hours) Maximum resolution times by type of problem Percentage of problems resolved in over 72 hours Volume of R&A requests by type
2. Cost targets: Cut error write-off costs by \$15 million with correspondent banks, and \$5 million retail customers	<ul style="list-style-type: none"> Monthly error write-off dollar amounts by type of customer Monthly error write-off dollar amounts by type of error Percentage of unresolved errors by type
3. Quality targets: 100% of all copies sent to customers must be top quality	<ul style="list-style-type: none"> Number of second requests for copies that are not legible
4. Knowledge creation targets: Create a Frequently Asked Questions database with continuous updating of error resolution procedures to help inexperienced personnel	<ul style="list-style-type: none"> Percentage of problems whose common solution is documented in knowledge base Frequency of access of FAQ knowledgebase classified by length of experience on job



Binding management decisions
1. Routine errors in the R&A process will be carried out by less experienced Level 2 personnel
2. The new check imaging technology will be used
3. Headcount will not be allowed to increase

DEFINE PROCESS BOUNDARIES

How do we discover and decide what the boundaries of a selected business process are? Where does the process start and where does it end? Who are the customers of this process? What are the outputs that the customers of this process get? What are the different types of triggers that start an instance of the process? What are the boundaries of the process? All these questions help to define the scope of a business process. Before redesigning a process, we need to define its scope.

Why is this step important?

- It builds an initial common high-level portrait of the process scope and what the process does.
- It counteracts the temptation for grandiosity! Reengineering an end-to-end business process typically spans multiple functional areas and often multiple organizations. It is easy to inadvertently find oneself in a huge BPR project that is not doable in a reasonable amount of time. To counteract this situation, we must carefully define the process scope very early in the process reengineering phase.
- It provides the BPR team with pointers for collecting data (i.e., from where) for the modeling phase.

How can this step be done?

The BPR team has to agree on the boundaries of the process to be redesigned. This can be accomplished in a group meeting. Follow-up may be necessary if clarification is needed from others or if missing information needs to be collected from other people. The following questions must be answered:

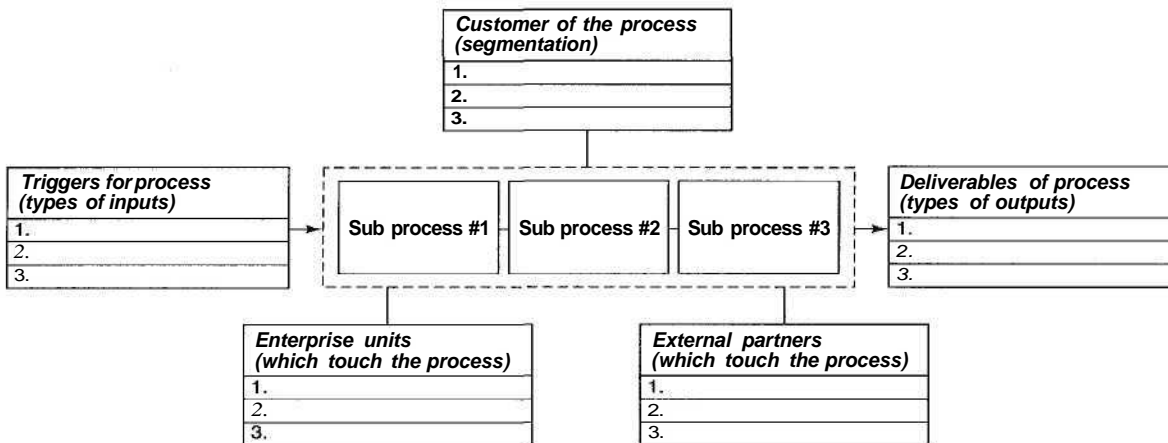
- Who are the customers of this process? What are their different categories or types?
- What are the outputs of this process? What are the different types of deliverables?
- What are the inputs to the process? What are the different types of triggers that start it?
- What departments inside the organization does the process "visit" or interface with?
- What other business processes in the organization does the process interface/interact with?
- What external entities (suppliers, service providers) does the process interface with?
- What are the few big chunks that the process can be divided into (subprocesses) that make intuitive sense?

An example of a template that can be used to structure the deliverables of this step is included (also included on CD-ROM). It is followed by the boundary definition for the R&A process at Paloma Bank.

In addition to answering the above questions, it is useful to identify the process owners and the process maintainers to accentuate their centrality to the management of the process. It is often the case that there are no process maintainers and a process reengineering effort should make sure that it ends up with a process maintenance scheme in

Process Boundaries

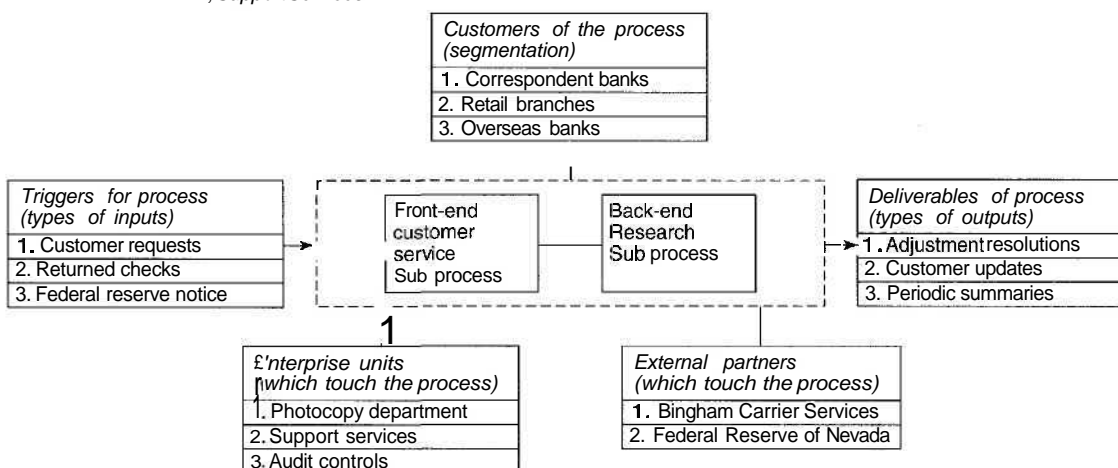
Process name:
Process owners:



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Process Boundaries

Process name: Research and adjustments process
Process owners: Senior VP, R&A
VP, Support Services



place. Including that identification as part of the process scope definition at the beginning helps to ensure that it happens at the end.

How many subprocesses should we chunk a process into?

If we have too many subprocesses, it becomes more difficult to see how major process changes can be made, and redesign is likely to be incremental. It also hurts the head! As a rule of thumb, between 3 and 10 chunks is typically a good number. The criteria for chunking should be the ones that make the most intuitive and managerial sense in that particular context. Generally, however, the sub-process should be constituted of tightly linked activities that belong naturally together. Examples of criteria for forming sub-processes include phases of progress of a business process and geographical locations that the process passes through.

Should the scope be set in concrete?

No! We need to allow room for the scope to change as our knowledge about the business process and its environment changes and, of course, as we rethink the redesign of the process. Changing the scope of a process is often a resultant strategy in process reengineering.

4-3: IDENTIFY KEY PROCESS ISSUES

The BPR team needs to assess what is known about the current state of the process before starting to further diagnose it for redesign. What are the critical problems related to the process? What is the state of the work environment around the process? Is the information technology infrastructure adequate? Are human resource practices conducive to the process being carried out effectively? What are the better portions of the process that are currently very effective?

This step is not meant to be a comprehensive analysis. The BPR team collects what is already known and summarizes it in a form that provides common understanding and guides redesign.

Why is this step important?

- It provides a common starting assessment point for the BPR team and flags areas requiring attention.
- In addition to identifying the issues directly related to the flow of the process itself, it identifies the key issues related to the work environment around the process. Sometimes redesigning the work environment around the process (for example, better training) does as much to improve the effectiveness of the process as does restructuring the process itself.
- It ensures customer input early in the process reengineering phase.

Before you can start identifying key process issues get customer input!

In order to identify the key process issues, it is critical that there be a sincere effort to gather input from the customers of the process and from other external entities that

interface with it, rather than just limiting input to the employees who are part of the process. Often, customer input has already been captured in Phase II of BPR in-the-BIG (Mobilizing the BPR Project) or through periodic customer surveys. If this is not the case, the BPR team must collect sufficient data from customers through questionnaires or structured interviews.

An example of a questionnaire structure for customers of the process and for other departments that interface with it is included. The graphical depiction at the bottom further illustrates the balance of the different areas of focus of the five questions. One common error in such questionnaires that can be distorting for analysis is to ask customers only about process problems and the current situation. It is helpful for balanced issue identification to also ask them about process strengths and future requirements. In addition, it is useful to understand how to reduce the time and effort that the customer expends with the process.

Following the example of the questionnaire structure are sample responses to questions used by Paloma Bank. They have been selected from responses from about 15 representative customers and co-departments surveyed at Paloma Bank. Note how the responses can uncover process issues by making your own inferences as you read through the sample responses.

CUSTOMER AND INTERFACING DEPARTMENT EXAMPLE QUESTIONNAIRE STRUCTURE

1. CURRENT EXPECTATIONS

- (a) What basic services do you expect Process X/Department Y to provide?
- (b) What, in your mind, represents superior performance?
- (c) What is the single most important thing that Process X/Department Y could do to improve the quality of service currently provided?

2. PROCESS PROBLEMS

- (a) What specific situations have you encountered with Process X/Department Y that you wish had been handled differently?
- (b) What, in your mind, would have been the best way to handle these situations?

3. PROCESS CREDITS

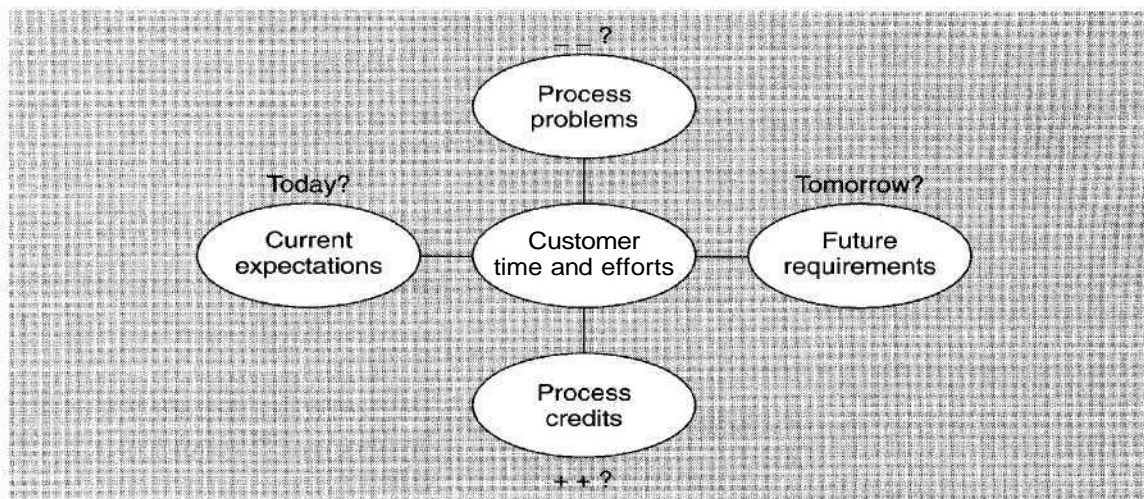
What aspects of Process X/Department Y's service do you like the most? Why?

4. TIME AND EFFORT EXPENDED BY CUSTOMERS AND INTERFACE DEPARTMENTS

- (a) What tasks, in your interaction with Process X/Department Y take the most time?
- (b) What tasks cause you the greatest difficulty? Why?
- (c) What tasks, if handled properly, would save you the most time?

5. FUTURE REQUIREMENTS

What aspects of the Process X/Department Y's service will become most important to you in the coming years? Why?



Paloma Bank - Sample Responses

CUSTOMER & CO-DEPARTMENT BPR SURVEY QUESTIONS

1. CURRENT EXPECTATIONS

(a) What basic services do you expect R&A to provide?

example responses:

- Correct adjustments to customer accounts on a timely basis.
- Copies of checks, statements, deposit slips, adjustments.
- Research and correct encoding errors, research and adjust discrepancies in deposits.

(b) What, in your mind, represents superior performance?

example responses:

- Turnaround time of 48 hours and 24 hours for large dollar amounts.
- Looking for correct entries between due to and due from accounts (major problem).
- Accept ASAP requests (As Soon As Possible) and rush requests congenially, and treat as such.

(c) What is the single most important thing that R&A could do to improve the quality of service currently provided?

example responses:

- Quicker turnaround time for research requests.
- Keep in contact with requester and give requester name and phone number of processor when research will take longer than normal.
- The copies we receive back to send to our customers. Think: Could I read this and determine the information I need? Put yourself in their shoes.

2. PROCESS PROBLEMS

(a) What specific situations have you encountered with R&A that you wish had been handled differently?

(b) What, in your mind, would have been the best way to handle these situations?

example responses:

- (a) Globco Insurance made deposits 5/26/98 which posted for \$35,754.73, sequence number 6408523—their deposit amount. Same day, we debited them \$32,590.15, sequence number 6408523. On 5/27/98, we credited their account \$32,532.99, sequence number 0093659; thus leaving them short \$57.16 with no explanation. They researched this in-house as they were reconciling their account and found nothing, so they asked us for backup. We worked with several people in research and were told they'd have to get copies of all the checks from the deposit. I explained that it was a large number of items and we would be absorbing the charge because the customer had not been sent a deposit adjustment but was told they would have to do it anyway. After making more than 20 copies, Research finally admitted that we were correct and credited the customer. The process took two months, the efforts of two corporate employees, the company's efforts, and the research efforts, ending up with the results we had requested at the beginning.
- (b) Knowing the expense in employee hours and copies could have avoided the expense to the bank and frustrations to the customer by giving them the money much earlier in the process. Knowing who or what area to work with in R&A would have been beneficial.
- (a) I received a copy of a big black blur. It was stamped "best possible copy." This could not be forwarded to our customers.
- (b) A phone call before it was sent out could have prevented a follow-up call once I received this copy. Some information could have been read to me that would have helped our customer and saved a lot of time.
- (a) Lost deposit that R&A gave provisional credit for. R&A could not find record and wanted the branch to take the loss. I, with assistance of local operations, reviewed the bank teller microfiche and found the deposit in order to settle with R&A.
- (b) Team work

3. PROCESS CREDITS

What aspects of R&A's service do you like the most? Why?

example responses:

- There has been so much improvement over the past two years. There is more on-line research, turnaround time has improved, and an effort has been shown through meetings/training to try and save time and money while performing quality work.
- The efforts that have been done to go back to error instigators who have excessive errors and trying to work with them on ways of reducing them.
- The courtesy of the personnel who answer the phone.

4. TIME AND EFFORT EXPENDED BY CUSTOMERS

- (a) What tasks, in your interaction with R&A, take the most time?

example responses:

- Finding out who to talk to about resolving a research issue. I know we have been given some contacts but more often than not that person is unavailable, now in a different job, or doesn't return your call. And no one else can help you so you get "passed around."

- Disputed deposit adjustments.
- Receiving debit and credit memos after adjustments have been made.

(b) What tasks cause you the greatest difficulty? Why?

example responses:

- Getting to someone who can understand your problem and fix it. Supervisors are very difficult to reach; clerks know little about the big picture.
- Teller corrections not being received in a timely manner. We have terminated tellers for outages and then received corrections.
- "Payable through draft" research because it is such an odd animal. R&A has done an excellent job, though, assisting in this area.

(c) What tasks, if handled properly, would save you the most time?

example responses:

- To have R&A contact the branch personnel promptly when needing further information to complete request.
- Having a liaison or representative to give me direction for handling research as it should now be done. The online system is good and it does work, but all research is not that simple or easy.
- Being able to speak to a clerk who made an incorrect entry. Discuss it and have it fixed immediately.

5. FUTURE REQUIREMENTS

What aspects of the R&A's service will become most important to you in the coming years? Why?

example responses:

- Speed in processing requests—customers expect a high level of customer service and immediate response, especially when the customer feels it is a bank error.
- All aspects. More prospects are becoming customers and we are getting more volume. High-speed processing may result in more errors.
- Online services such as IMAGE made available to both us and the customer to eliminate the "middle-man" and research/copies can be handled immediately.

How can the "identify key processes" step be done?

Armed with relevant inputs (from customers, other departments, and external entities) the BPR team needs to discover and distill the key process issues. It also needs to involve a select number of direct process participants and elicit their inputs. To carry out this step, it is both more effective and more efficient to use a structured group session that includes both the BPR core team and some direct process participants. Alternatively, organizations that are more adept at using electronic group support tools such as

E 4-2 AGENDA FOR KEY ISSUES SESSION - **PALOMA BANK**

Time (Start-End)	Activity	Length of time (hours)
9:00-9:15 A.M.	Review ground rules/agenda	:15
9:15-10:30 A.M.	Brainstorm R&A issues	1:15
10:30-10:45 A.M.	Break	:15
10:45-12:00 noon	Brainstorm & categorize issues	1:15
12:00-1:30 P.M.	Lunch and open discussion	1:30
1:30-2:30 P.M.	Prioritize issues	1:00
2:30-2:45 P.M.	Break	:15
2:45-4:00 P.M.	Identify top issues by category	1:15
4:00-5:00 P.M.	Identify "Quick Hits"	1:00

Lotus Notes can do this step through online iterations. Whatever the method used, this step requires the completion of the following activities:

- Elicit process issues (both problems and strengths) through a **brainstorming** method with a group of relevant participants. Be sure to combine this with the results of customer input.
- Categorize process issues to distinguish between those directly related to the process itself and those related to the work environment around the process (information technology infrastructure, human resources, for example).
- Distill key process issues and present in a summarized form that can help guide the process reengineering effort.


Table 4-2 shows the agenda for the group session used to identify the key issues for the R&A process at Paloma Bank. The last hour in that session was spent identifying what they called "Quick Hits." These are quick and easy changes that can be done immediately to the process or its work environment and will yield noticeable improvements. For example, when discussing the quality of photocopies, one of the issues raised was that the photocopy machine glass surfaces were not clean, which made copies worse. To clean the surfaces regularly is an easy temporary fix, but will not end up necessarily as part of the new process redesign. Copiers will be replaced with digital check imaging technology! Thus these quick hits cannot be seen as more than temporary relief while the process reengineering is in progress; they should be exercised with caution.

The table is followed by two forms that were used to present the summary results of the session. The first form is a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis for the process. Note that an inclusion of threats and opportunities forces us to look beyond the current state of the process and alerts us to longer-term issues, while also generating ideas for new potential business opportunities. The second form is an assessment of the work environment around the process and includes four categories: information technology infrastructure, human resources and training, organizational de-

sign and policies, and customer and external linkages. This categorization facilitates both comprehension and further use in later process reengineering phases. It also ensures the inclusion of the "customer and external linkages" category, which is often missed and its conditions taken as given. This latter category is important because it uncovers opportunities for changing the way that the process interacts with those external entities.

Is this the end of process assessment?

No! This is just a starting point. Assessment of the process continues as the modeling and analysis phases uncover more of the realities of process performance and redesign opportunities.

PALOMA BANK		SWOT  ASSESSMENT OF PROCESS	
Process Name: <u>Research & Adjustments (R&A) Process</u>			
STRENGTHS Strengths of the process as it is now?		WEAKNESSES Weaknesses of the process as it is now?	
Top 3		Top 5	
1. Process has survived the consolidation of California, Nevada, and Arizona operations. 2. Imaging technology is successfully implemented into process. 3. Information for the process can be accessed successfully through existing IT infrastructure.		1. Provides poor controls/accountability. 2. Provides poor customer feedback mechanism. 3. Process is fragmented and has poor information hand-offs. 4. Process is non-standardized and training documentation is out-of-date. 5. Process cannot be reconfigured for abnormal workloads.	
OPPORTUNITIES How can the process generate new value?		THREATS What changes can cause process decay?	
Top 3		Top 3	
1. Can enhance relationship banking with large corporate customers. 2. Can sell the service to other banks. 3. Can be used as a model for other bank processes.		1. Process may be unable to take advantage of changes in interstate electronic banking deregulation laws quickly enough. 2. Process may decay with lower skilled personnel. 3. Data management costs will escalate exponentially with anticipated growth.	

PALOMA BANK		ASSESSMENT OF WORK ENVIRONMENT AROUND PROCESS	
Process Name: <u>Research & Adjustments (R&A) Process</u>			
INFORMATION TECHNOLOGY INFRASTRUCTURE How <u>ii</u> IT <u>in</u> supporting and enabling the process?		HUMAN RESOURCES & TRAINING How adequate are human resource skills for effectively driving the process?	
Top 3 Issues 1. The IT tool-set now available for performing the research unc ffrn is a poorly integrated and user-unfriendly set of tools that have been adapted over time by implementing "workarounds." 2. The IT tool-set is ill-suited to a multitask environment with different database systems for each of the three states (California, Arizona, Nevada). Data is re-keyed when items are transferred from one state to another. 3. * fll the coming introduction of digital imaging at the bank , the dis k storage and network bandwidth requirements will increase dramatically, and the current capacity will be inadequate.		Top 3 Issues 1. With turnover rates of between 20 and 40 percent after consolidating in Carlsbad, the experience level of the average researcher is lower. 2. Trainer for R&A clerks tends to be very narrow and in some cases focuses on only one type of error. Training materials are incomplete and out-of-date. 3. Feedback from line managers in retail area indicates that inadequate training for tellers	
ORGANIZATIONAL DESIGN & POLICIES i How effective are organizational s tructures, I practices, and reward systems in facilitating and improving the process?		CUSTOMER & EXTERNAL LINKAGES If How effective are with customers and external organizations in facilitating and improving the process?	
Top 3 Issues 1. Career path for research clerks is not as attractive as it usec o be; j 2. Reward system is not to te amw ork. 3. too many departments with too many hand-offs.		Top 3 Issues 1. Contacts and procedures for working with the Federal Reserve Banks and Correspondent banks are not formally maintained as part of the R&A process. 2. There is no formal "coaching" procedure as part of the R&A process for external parties that have high volumes of repetitive errors. 3. There are no formal "VIP" procedures for cor rs when one of their items is in the R&A process.	

STAND KNOWN BEST PRACTICES AND DEFINE INITIAL VISIONS

Understanding known best practices is not benchmarking in the formal or rigorous sense. Formal benchmarking for a process can only be done after the process is modeled and carefully understood and detailed, which occurs in Phase 2 of process redesign. In this

early premodeling phase, we are just making sure that the BPR core team is generally aware of known best practices for the selected process so that they do not reinvent the wheel. For example, if this is a customer service process related to banking transactions: Is the BPR team aware of what the financial institutions that are on the leading edge of customer service are doing? Do they understand some of the best practices in customer service in other industries that they can learn from? Do they know how new information technologies can change the way that customer service is provided?

Similarly, defining initial visions of the new process is meant to capture in very preliminary and high-level terms what has been envisioned so far and documenting it as an inspiration for moving forward in the modeling and redesign phases. As the phases progress and more learning occurs, this initial vision may be changed many times and operationalized in different ways.

Why is this step important?

- It would seem unlikely that the core BPR team not understand known best practices related to the process they are reengineering, given that some members of the team are selected for their intimate knowledge of that process. Bright and intelligent individuals, however, are often engulfed in fighting day-to-day operational fires and do not make the time to look at what is happening beyond their immediate environment. This step ensures that the BPR core team goes into the redesign phase equipped with a shared understanding of known best practices. Such understanding will better inform the process reengineering effort and provide ideas.

- Adapting another company's or a different industry's process solution to one's own company can often be a very rapid and yet robust way to reengineer a business process.

- Defining and documenting preliminary visions of the new process early and before baseline modeling brings excitement and energy to a BPR project. Even if the vision is fuzzy and it turns out to be wrong, it is still useful for energizing the team.

How can this step be done?

One member of the team should be responsible for briefly listing known best practices based on his or her interactions with the other team members. If the BPR team feels inadequately informed, then they should quickly familiarize themselves with known best practices through reading, visits, seminars, and possibly consultants.

The definition of the initial vision should be agreed upon by the BPR team in a group meeting. The vision is based on what has been learned so far from all the previous phases of BPR in-the-BIG. It is typically expressed as a set of paragraphs depicting the new process and its work environment or a high-level process diagram of the new process.

An example of a diagram of a **preliminary vision of the new R&A process for Paloma Bank** is shown in Figure 4-2. The newness of the vision is based on injecting a new process facilitation group (so the process can be continuously improved and maintained and error instigators can be educated), changing the role mix of staff in the process by having knowledgeable research consultants as they interface to both customers and researchers (rather than unskilled receptionists) recording the customer's request (so the problem is diagnosed early and customer interactions are at a higher level

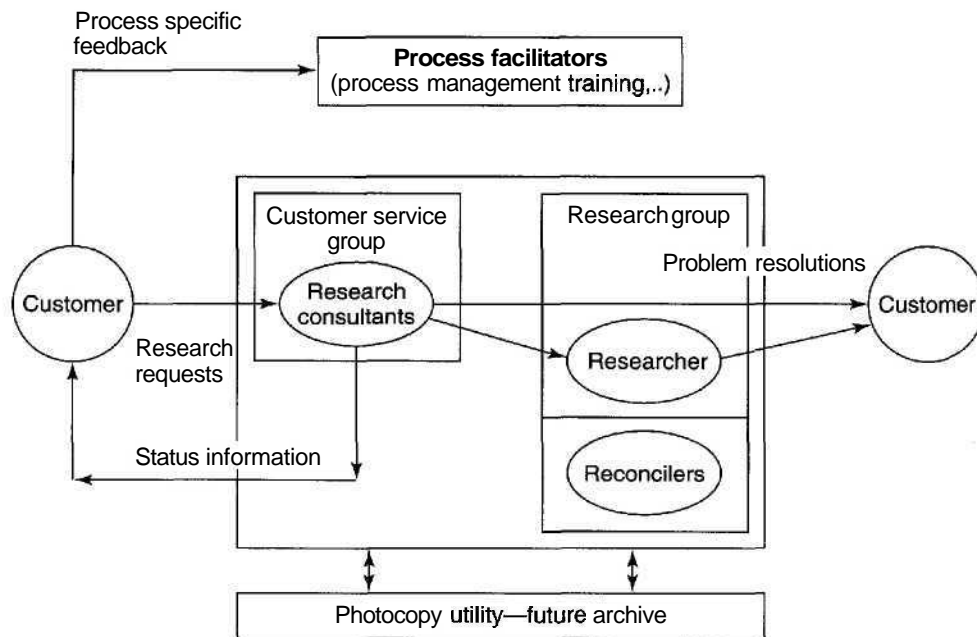


FIGURE 4-2 Paloma Bank R&A new process vision (preliminary)

of sophistication), and changing the feedback loops to the customer so that the customer is informed of the progress of problem resolution at all times. Paloma Bank also had an **information technology (IT) vision** at this early premodeling phase that is shown in Figure 4-3. It is a three-layered IT vision that starts with BPR software to redesign the process (continuous redesign and improvement as the environment changes). The output of the BPR software (a modified process design) is directly exported to workflow software that can immediately modify the enactment of the automated part of the process and the accompanying information flows. The third layer is a Lotus Notes software layer used to both pull together information from disparate heterogeneous transaction databases and to capture knowledge about the R&A process to increase the skill level of employees.

4-5: FAMILIARIZE PARTICIPANTS WITH BPR SOFTWARE

By the end of this premodeling phase, the various BPR participants must become familiar with the selected BPR software and its capabilities. There are different degrees of familiarization with BPR software suitable for different types of participants:

« **Conceptual Familiarization:** All BPR participants should be given a brief overview of what BPR software is, what the selected package's capabilities are, and what type of process and organizational data it can handle. A conceptual introduction, a demo, and a **capability** overview for the selected BPR software package and how these

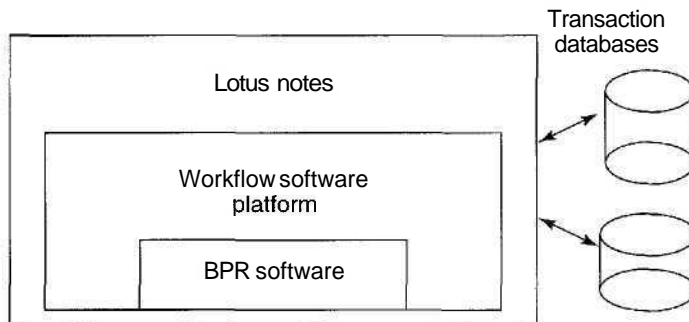


FIGURE 4-3 Paloma Bank R&A information technology vision (preliminary)

capabilities will be useful in the BPR project is sufficient. A well-planned hour or two can suffice for conceptual familiarization.

- **Test Drive:** All members of the BPR core team should test drive the BPR software whether they will be modeling processes directly themselves or not. This can be done by either a short hands-on class (two hours) or by going through an introductory tutorial (two hours) that illustrates the basic functions of the software on a simple process.

- **Learn to Use:** Members of the BPR core team who will be directly involved with modeling, analyzing, and redesigning the process must learn how to use the software prior to the baseline modeling phase, even if they will be helped by consultants. This can be done through courses (about two days) offered by the software vendor or by going through a self-paced tutorial.

As BPR software is a new class of software that has only blossomed in the last few years, there are not many people who have had much experience with it. However, every BPR team should have a few (at least one!) experienced modelers with some previous experience in using software tools for modeling and analysis, even if in other contexts such as information systems design or industrial simulation.

Why is BPR software familiarization important for all BPR participants?

- The use of BPR software tools (good ones!) changes the way we think about processes. The mindset brought about by the BPR tool and its underlying process models become a common language for communicating about the process among all BPR participants. Everyone should be familiar with the process concepts behind the BPR software tool so that there is shared understanding. This accelerates the BPR project in both design and implementation phases.

- If the BPR effort is indeed one step toward a continuous process management policy, then familiarization with BPR software will make the identification and communication of required future changes much more expedient.

- The resultant process models can be used as learning tools for staff who would like to know more details about a particular part of the process. Understanding how to use the BPR software to do that is very useful.

4-6: OUTLINE DATA COLLECTION PLAN AND COLLECT BASELINE DATA

Having defined the process scope and assessed the key process issues, the BPR team is now aware of which subprocesses and which departments and external entities it needs to collect more data from, and what the nature of some of the data needed is. Now familiar with the BPR software tool, the team also now knows which form and level of aggregation the data is most appropriately in.

Why is this step important?

- Data collection takes time and effort and involves many people. The more planned and focused it is, the less likely time will be wasted and unnecessary data collected. People are busy and have jobs to do—providing data for a BPR effort is not necessarily their first priority. An effective process model is only as good as the data that define it.
- An organized data gathering plan and an early start in data collection speeds up the baseline modeling phase (Phase 2). Missing data necessary for modeling can be identified early and remedies found with less delay.
- A well-orchestrated data collection effort with sincerely sought input from people involved with the process helps increase buy-in for the BPR effort. Apart from easing implementation, it almost always improves the quality of the process redesign outcomes.

How can this step be done?

- **Identify sources:** From the process scope definition, the BPR team identifies the organizational units (departments and functions) and external entities that the process interfaces with. For each of these it then identifies key informants (people) who will be the primary sources of data.
- **Select case categorization criteria:** The BPR team must select the criteria around which it will categorize the various versions of the process (i.e., process cases) and its subprocesses. These have already been partly identified through the process scope definition. Possible criteria include process interface criteria such as type of customer, type of deliverable, and type of trigger, or internal process criteria such as major decision points or major exceptions. These criteria can differ from one subprocess to another. As more data is collected from the people in the process, more representative criteria may emerge and the data collection effort modified accordingly.
- **Define types of data needed:** The BPR team outlines the types of organizational and process data that are needed based on the identified process performance targets, which are the key process issues. Organizational data typically include resources used in the process, their cost rates, and any other targeted measures (asset turnover, skill level, for example). Process data include identifying the various tasks that constitute the process, their inputs and outputs, their decision points and associated choices, and their resource assignments.
- **Define data collection methods:** The data collection plan can then be outlined. The plan must identify data sources (archival or key informant) for each data set, assign a member of the core BPR team to each data set, and recommend a data collection method for each source. A time line should be established and the data needed for baseline modeling scheduled to be collected first and very quickly, while providing a later schedule for detailed data collection that is anticipated for more detailed modeling.

- **Start collecting baseline data:** Agreement on the data collection plan should be accomplished quickly, and data collection for baseline modeling started immediately.

Is data collection difficult?

Yes, it can be and usually is, especially when there is missing data; or if it is the first time that the people in the process (these are a primary data source) try to describe the process; or if they do not give the BPR effort enough attention because of other priorities or dislike of BPR. That is why the BPR Project Mobilization Phase (Phase II of BPR in-the-BIG) is so important—it readies people for cooperation in providing relevant operational data and process descriptions. Note that even though the big push for data collection occurs at the start of modeling, it continues sporadically throughout the phases as the BPR team identifies new data that may be required as they discover new redesign options. Note also that a large part of data collection, especially task descriptions, requires skillful elicitation and coaxing in order to help verbalizing or describing in visual form. It is often a process of joint discovery. In process redesign, data collection and learning about the process are heavily intertwined and difficult to separate. This learning process is essential for generating ideas for redesign.

What are the different data collection methods?

There are many data collection methods that range from the very informal (hallway chatting) to the very formal (fill in the blanks on the form). The choice of combination of methods depends on the degree of existing documentation on the process, the type of informants, the culture of the organization, and the relationship of informants with the BPR core team. It is common to have a mixture of the various data collection methods in any one BPR project. The more common methods are:

- **Using documents and archival data:** This method is useful to the extent that the process description is already documented or graphically depicted. It should be supplemented by brief explanatory face-to-face meetings or telephone conversations to check the validity of the documentation.
- **Structured interviews with groups:** A group session with several informants focused around a specific part of the process has the advantage of efficiently bringing together multiple perspectives. The BPR team structures the questions and leads the session. Another advantage of this method is that group members stimulate each other and trigger each others' memories about aspects they may have forgotten. The BPR team is also able to see the degree of consensus about the workings of the process. The disadvantages of this method are that it may be difficult to schedule and some personalities may dominate the discussion. The BPR software tool may be used to directly enter the data, thus starting the baseline modeling while collecting the data.
- **One-on-one structured interviews:** When group interviews are not appropriate, individual interviews, whether face-to-face or by telephone, can be used. This allows for more in-depth exploration of particular aspects that the informant is especially knowledgeable about. The BPR software tool may also be used here to directly enter the data.
- **Questionnaires/forms/templates:** When subprocesses can be easily partitioned into distinguishable tasks at the outset, structured forms can be distributed to informants

to fill out. These forms can be designed as questionnaires or tables to be filled out or even graphical templates. Some BPR tools have online templates to facilitate this method.

What is appropriate data for baseline modeling?

There has to be sufficient data collected so that an end-to-end process mapping is possible with enough detail to enable the process to be generally understood and some of the simpler targeted performance measures can be calculated. This is necessary for establishing an initial baseline. Several strategies are possible:

- **Default case or typical process cases:** One possible initial strategy is to collect enough data to map the default process case (i.e., the process case that occurs most commonly) or the few process cases that occur a majority (say 90 percent of the time). This strategy facilitates understanding for further modeling and redesign, but will not yield reliable baseline measures as it is usually the exceptions that cause most of the variance in process performance.
- **Squeaky wheel process cases:** A second strategy is to collect data about process cases that would appear to cause the most problems or time delays. This strategy is less useful for understanding the process in general, but better for quick zeroing in on problems. It will tend to push the redesign to center around avoiding the killer exceptions. It is useful when there is no dominant process case.
- **Exhaustive process cases:** If a process is well documented and structured so that the process cases are limited and known, it is possible to collect data for all the process cases that are possible. This is usually possible at the outset for simple processes only.

Baseline Data Collection Strategy

Paloma Bank decided to use the default case strategy at first for baseline data collection. The various versions (cases) of the R&A process were determined by the type of customer and the type of error that triggered R&A requests. The type of customer determined the flow of the front end of the research process and how the inquiry was routed (VIP customers, small-volume customers). They gathered data about each of these two cases for the front end of the process. The data collection and elicitation was done through group sessions with process participants. It spilled over into the baseline modeling phase and they started to use the BPR software to capture it directly.

The various cases for the back end of the process were triggered through error types. Operational reports from the previous year showed that 10 types of errors accounted for 96 percent of all cases. Of these 10 types of errors the most common (37 percent of all cases) were encoding errors (i.e., an item is processed by the bank for the incorrect amount). The BPR team and the process participants decided to collect process data for that particular case. The various tasks that constituted the process were identified and listed in a group session. It came to their attention that many of the tasks that were done for encoding errors were also done for many of the other types of errors. As a result, the team decided to switch strategies midway and collect data for all the 10 types of errors. They started to identify tasks that were common to all types of errors and came up with 19 common tasks. Again, this spilled over into the baseline modeling phase and they started to use the BPR software to

structure the process and enter the data directly. This was done in a group session with both the BPR team and key informants present.

Paloma Bank was somewhat schizophrenic about the interplay between the “as-is” process and the “to-be” process. They had a messy incomprehensible diagram that depicted the “as-is” R&A process and the departments involved and felt they did not want to model it in detail—they wanted to jump right in to the “to-be” process modeling. However, they felt that many process elements (the 19 common tasks they identified) in the error resolution part of the process were excellent “as-is” and they wanted to include those tasks in the “to-be” process. Their data collection plan for baseline modeling centered around a “to-be” process with some “as-is” components.

Can you design your own data collection forms?

For organizational contexts where it is more appropriate to gather the process data through written forms, you can certainly design your own custom forms to fit the situation. Suppose you are at Paloma Bank and want to collect data on a specific set of tasks “initiating a research request” done by a research clerk. You could design a simple form and give it to several clerks. A filled-in example form is shown below. Note that it is not easy to completely articulate what goes on.

Name of set of tasks: *Initiate Research Request*

Please use one paragraph to describe the set of tasks in narrative form (story-like format):

First, I review the request or item, then I determine the nature of the research required. I figure out if the item is On-Us or Not-On-Us. At this point I request a photocopy. Then I check for offsets in things such as dollar range and amount. Then I start to look at the customer's account, then I check posting information on the XYZ system, and then I request a tracer number.

Based on your story of how this set of tasks is performed, is there only one way that you use to perform them? Yes ☒ (No)

What are the conditions that cause you to choose one way to perform this set of tasks over another? What do you do differently?

Depends on the type of item and what the urgency is. Sometimes I request a tracer number right away. I sometimes have to stop a request to process a more urgent one. Also, when the photocopy is not legible I have to get on the phone and do it line by line.

What events cause the most delay in carrying out this set of tasks?

When I have to switch to a more urgent request, I have to start over with the request I stopped. Also bad photocopies. The group in photocopying is sloppy.

4-7: PROCESS SCOPING REPORT

The deliverable of this phase is a Process Scoping Report. This report should be provided to the process owners for reporting and feedback purposes. It can also be provided to the BPR project sponsor. But most importantly, it is used as a focusing and guiding device for the BPR core team as it starts the modeling phases.

How can the Process Scoping Report be packaged?

If you have carried out the steps in this phase in the way that this chapter describes, the components of your deliverable are ready to be packaged into a crisp document without modification. All it needs is an executive summary that ties the various components together in an integrated logical way. The report should be as brief and as accessible as possible. Details can be accessed through original documents if they are needed.

Example of the structure of a process scoping report:

- Executive summary (one page maximum)
- Brief explanation of the steps taken (one page maximum)
- Process performance targets (Page 85)
- Process boundaries (Page 88)
- Key process issues (Pages 95 and 96)
- Preliminary vision of new process, if any
- Data collection plan and plans for Phase 2

The BPR team is now ready for modeling!

5

FOUNDATIONS OF BUSINESS PROCESS MODELING AND ANALYSIS WITH BPR SOFTWARE

5-1: WHY USE BPR SOFTWARE?

5-2: WHAT IS A BPR MODELING AND ANALYSIS METHOD?

5-3: THE SPECTRUM OF MODELING METHODS ADOPTED BY
BPR SOFTWARE

5-4: UNDERSTANDING BPR MODELING AND ANALYSIS
FOUNDATIONS

5-4-1: Building Block #1: Activity Decision Flow Diagrams

5-4-2: Building Block #2: Linking Resources to Activities

5-4-3: Building Block #3: Rules of Graphical Connection

5-4-4: Building Block #4: Activity Path Management Capabilities

5-4-5: Building Block #5: Process Performance Measurement

5-5: RAMPING UP YOUR MODELING SKILLS

5-5-1: Taking Advantage of HoloSofx CD-ROM Help Files

5-5-2: Working Through the Online Tutorial

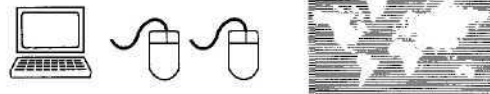
5-5-3: Process Modeling Tips

WHAT CHAPTER 5 IS ABOUT

This chapter explains what BPR software is and why you would want to use it. It also explains the basic ideas underlying business process modeling and analysis methods through the HoloSofx Workflow BPR Modeler software. Simultaneously you will test-drive the software and learn its basic capabilities.

BPR software adaptation of old Chinese proverb:

A journey of 1000 business process improvements starts with a double-click . . .



5-1 WHY USE BPR SOFTWARE?

BPR Software in Brief

As explained in Chapter 1, BPR software is a category of business software that emerged in the mid-1990s. BPR software captures the key elements of real-world business processes by representing them through software objects that allow us to model the process, analyze it, redesign it, and structure it for workflow implementation and information systems design.

Each type of process element (process, task, input/output, for example) is represented by a software object that has different attributes and a particular graphical shape when it appears on the computer screen (rectangle, circle). BPR software allows us to draw and redraw complex processes easily. It also allows us to link resources that perform work (people, machines, software) with various tasks in a business process where they are used. BPR software does process performance calculations under different conditions and enables us to see the effects of many what-if questions as we rethink and change the design of a process. When we have a design for implementation that we are happy with, BPR software should also be able to enact the process model in a form that makes it easy to implement and integrate into the business.

Cautious Excitement?

Similarly to how you would view any emerging technology or business tool, you will tend to view BPR software with cautious excitement at first. After all, it will require some effort to learn, even though you will also be learning how to carry out process redesign in a more enlightened way. Moreover, you may have to change the way you think about business processes and how they are redesigned and innovated—new tools invariably enable new ways of doing things. However, like other emerging tools and technologies that have become mainstays in their respective domains, it will prove its benefit and once you start to use it, you will not do without it. After you finish going through this book and using the included BPR software, you will wonder how serious process redesign for e-business could ever have been done without BPR software. I have listed below my ‘Top Ten’ reasons why BPR software is valuable. In the spirit of Top Ten lists, they are listed in reverse order, building-up to the #1 reason.

Choosing BPR Software

You will not really appreciate these advantages until you experience using a good BPR software package yourself. As in any category of business software, there is a spectrum of BPR software offerings that differ in quality, capabilities, business orientation, and ease of

use. Like any popular emerging software category, there are also software products from other categories (drawing tools, CASE tools, groupware tools, for example) that have limited facets of BPR tools. This book is not the place for product comparisons and the emerging marketplace for BPR software is continuously evolving. The choice of the Workflow BPR Modeler software from HoloSofx for this book reflects my confidence in it as a solid process redesign tool that captures the essence of good process modeling and analysis. It is a proven professional tool in practice that is designed specifically for BPR; it has at its heart a robust process modeling method; and it has been adapted for e-business. But what is business process modeling and what is a BPR modeling method?

The Top Ten Reasons Why You Will Value BPR Software

10 Graphical representation of processes on a timeline: BPR software allows easy capture of relevant process data (activities, resources, organizational data) into an organized repository that facilitates graphical representation of process flow on a timeline. The timeline typically shows activity sequence, decision points, and interdependence under different process conditions. With the point, click, drag, and drop capabilities of today's graphical interfaces, BPR software allows us to graphically build representations of complex business processes with the same intuitive ease with which Lego blocks are used. Modifications are easy and logic can be checked.

9 Examining process at any level of detail: BPR software allows us to model, graphically display, and analyze a business process in cascading levels of detail. We can hide detail if we want to examine a process at a more aggregate level, but we can also drill down to the most detailed task level when we need to.

8 Graphical objects that are "live" with data: Different from drawing and flow-charting software, the graphical objects displayed through BPR software have process and organizational data attached to them. This is "live" data that is able to select different process paths and is used for process performance calculations and for comparing process redesign alternatives.

7 What-if capabilities: With BPR software, it is easy to ask what-if questions based on different process designs and organizational parameters and to assess their impacts on process performance.

6 Animated simulation: BPR software can simulate process behavior based on probabilistic input rates with visual tracking of work in queues and can uncover process capacity bottlenecks.

5 Case generation and analysis: BPR software captures the various versions of a process (process cases) allowing you to do analysis and redesign of a particular process case (perhaps the one that has the worst performance) or a comprehensive assessment of all possible cases combined (based on the relative frequency of their occurrence). This is extremely useful in understanding and finding solutions for performance problems in a process.

4 BPR software is a business tool: BPR software is targeted to the business professional in terms of the types of process analysis and reporting it can produce, its resource allocation capabilities and links to costing, and the usefulness of its outputs for presentation to management.

3 When you can explicitly describe a process, you deeply understand it: BPR software forces careful and blow-by-blow descriptions of process specifics. That articulation/visualization exercise deepens your understanding of how a process really works. BPR software provides a medium that is much more engaging and illuminating for carrying out process reengineering than hand waving, narrative descriptions, or scribbled wall-charts.

2 A shared business language for communicating about processes and BPR: Using a common visual language with standard (and appropriate) representations of processes and their interconnections immensely facilitates group learning and communication with others about business processes and their improvement. Unlike CASE software that is used for information systems design, BPR software speaks the language of business processes and management rather than the language of data flows and software engineering.

1 BPR software changes the way you think about processes and BPR: Much learning about processes and how they work will occur after you have used a BPR software tool. It will sensitize you to the importance of coordinating dynamic interdependence among the different parts of a business process. It will change the way you approach business problems and your thinking will become more process-centered and more cross-functional.

5-2 WHAT IS A BPR MODELING AND ANALYSIS METHOD?

What Is Business Process Modeling?

A *business process* is a coordinated set of work activities and associated resources that produces something of value to a customer. A *business process model* is a representation that tries to capture the aspects of the business process that are key to understanding its functioning and performance in reality. At a minimum, it must be able to represent activities that make up the business process and how they relate to each other; it must be able to link resources to activities; and it must be able to show how the set of activities and their sequence changes when conditions change. Business process modeling is what you do when you build a business process model.

What Is Business Process Model Analysis?

Business process model analysis is what you do when you examine the structure and performance of a process model and assess the impact of varying its parameters. Analysis is intimately connected to modeling and in practice they are difficult to totally separate. Furthermore, the method you use to model a process defines the ways that can be used to analyze it. Loosely speaking, process modeling methods comprise both modeling and analysis capabilities.

What Is a BPR Modeling and Analysis Method?

A *process modeling and analysis method* is a language and procedure with underlying process concepts and representations that make it possible to build process models and

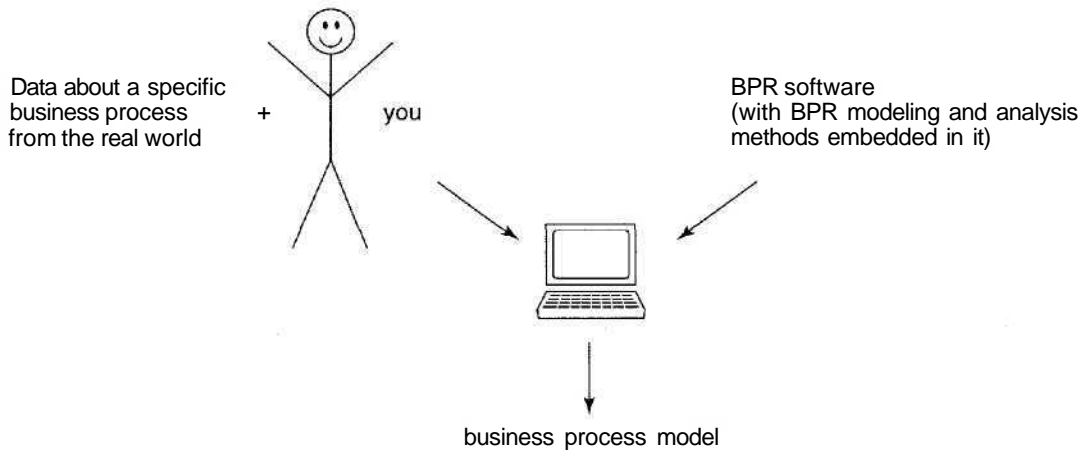


FIGURE 5-1 Modeling with BPR software

analyze them. A **BPR modeling and analysis method** is a business process modeling method that is geared specifically to BPR. In other words, it is geared specifically to situations where the process model will be analyzed in order to diagnose problems, find opportunities, and examine alternative designs for process performance improvement. Thus, BPR software needs to have BPR modeling and analysis methods embedded into the functionality of the software that enables users to build a model of their business process in a form specifically suited to BPR (see Figure 5-1).

What Makes Up a BPR Modeling and Analysis Method?

There are five essential aspects that are required to constitute a BPR modeling and analysis method. Without them, the modeling method is inadequate for BPR. The five building blocks in combination provide the means and conceptual infrastructure to build and analyze a business process model for purposes of BPR.

Building Block #1 Structural elements of business process flow. A way of describing in *business terms* the inner workings of a process (structural elements and their interdependence) along a time line and at various levels of granularity and graphically representing them. The way this component is conceptualized defines much of what the other building blocks need to be able to do.

Building Block #2 Organizational resource links to business process flow. A way of defining resource types, allocating them to parts of the process, and accounting for their use.

Building Block #3 Rules of graphical connection. A system of logical rules for connecting activities that can be understood graphically so that users can manipulate process designs graphically.

Building Block #4 Method of conditional concatenation of process parts. A way of concatenating together appropriate process parts (like a chain) to form a logically correct, connected, end-to-end business process model under different conditions.

Building Block #5 Process performance measurement. A way of calculating various business process performance measures under changing conditions and asking what-if questions.

Of course, these five building blocks also need to work together in concert. Furthermore, at a minimum they need to be integrated into a user-friendly business-oriented software package that has a data repository, report generation capabilities, simulation capabilities, and an intuitive graphical interface.

There is a whole spectrum of process modeling methods that has been devised and undoubtedly there will be more. The reality of practice is such that not all modeling methods have these five building blocks, and furthermore there is a variety of ways of operationalizing them. Consequently we have ended up with many modeling methods embedded in many different software tools with varying degrees of fidelity. Some are better suited to BPR than others. Making sure that all five building blocks are embedded in the BPR software is a good way of determining how suitable a particular software tool is for BPR.

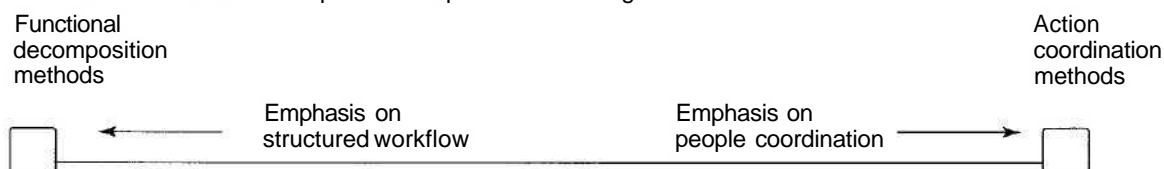
5-3 THE SPECTRUM OF MODELING METHODS ADOPTED BY BPR SOFTWARE

Software packages currently on the market that classify themselves as BPR tools can be categorized along a spectrum based on how their modeling methods conceptualize the inner workings of a process model as shown in Figure 5-2.

Functional Decomposition Modeling Methods At one end of the spectrum are modeling methods that come from an industrial engineering and software engineering tradition and focus on structured workflow. At the extreme, these tools tend to reify the linear breakdown of tasks into smaller units within a function in an organization and are not very good at handling task interdependence in dynamic conditions. A functional decomposition approach describes activities in a hierarchical tree from the perspective of all the functions that are typically done in an organization without representing the time-dependencies or a process flow. An example of such a type of method is the IDEF0 function modeling method (USAF, 1981).

Action Coordination Modeling Methods At the other end of the spectrum are modeling methods that come from the computer-supported collaborative work tradition that emphasize the coordination of people and their actions. These tools are good for interactive processes that rely on much negotiation between people but are not very good

FIGURE 5-2 The spectrum of process modeling methods



at handling structured workflow and process performance measurements. An action coordination modeling method is based on describing activities in terms of the steps of human interactions and how they form networks of loops. An example of such a type of method is the Action Workflow modeling method (cf. Medina-Mora et al., 1992).

Straddling the Spectrum Good business process modeling for BPR requires a modeling method that can straddle both ends of the spectrum and handle both structured workflow and dynamic interdependence. There have been three generic approaches to solving that problem. One approach is to retrofit functional decomposition methods with event triggers in order to take task interdependence into account. One example is the ARIS method (cf. Scheer, 1998). Coming from the other end of the spectrum, a second approach is to augment action coordination methods with added workflow structure through Petri net activity representation (Peterson, 1977) in order to be able to handle structured production-oriented processes. One example is the Role Activity Diagramming method (cf. Huckvale & Ould, 1995). The third approach is to devise new process modeling methods that are specifically targeted to BPR and are centered on process flow. These have ranged in capabilities from simple flowcharting techniques such as the Rummler-Brache method (Rummler and Brache, 1990) to techniques that allow for sophisticated process performance calculations under changing conditions such as IDEF3 (cf. Mayer et al., 1994) and Activity Decision Flow (ADF) diagrams (cf. Khorshid, 1993). The new methods that have been devised specifically for BPR are more powerful than the retrofitted ones and are also more appropriate for understanding the foundations of process modeling and analysis, which is the focus of the next section of the chapter.

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5-4 UNDERSTANDING BPR MODELING AND ANALYSIS FOUNDATIONS

We use the Activity Decision Flow (ADF) method in this section to explain the basic ideas underlying BPR modeling and analysis. This modeling method has been devised specifically for BPR and is embedded in the Holosofx Workflow·BPR software included with this book. It is also a robust business-oriented modeling method that has been successfully tried in practice. As it is a method specifically targeted to BPR, it has the five key building blocks outlined earlier. So it is both appropriate and convenient to use it to explain BPR modeling.

As in any emerging business software category, there is always a movement to set standards that are widely recognized and consistently applied. This facilitates compatibility, eliminates confusion, and makes communication simpler. The BPR software industry is no exception and in 1994 the major software vendors in the workflow and BPR area formed an industry consortium in the U.S.A. known as the Workflow Coalition. The Workflow Coalition has come up with a common recommended lexicon for workflow and business processes for adoption by software vendors. The Holosofx software has adapted its modeling methods to be compatible with that standard lexicon. Thus understanding the foundations of business process modeling through the Holosofx software will also enable you to get a good handle on the BPR modeling vocabulary in general and on standard industry practices.

We will examine each of the five building blocks of BPR modeling and analysis methods that we identified in the previous section. The modeling method dictates the way we can model and analyze a process. Thus through examining and understanding the underlying building blocks that make up the method, we can learn how to model. When the method is embedded in software, we can also do it experientially. Therefore we will explain how to model through understanding the ADF method and you will simultaneously test-drive the Holosofx software and build a business process model yourself.

5-4-1 Building Block #1: Activity Decision Flow Diagrams

The inner workings of a process are modeled through Activity Decision Flow diagrams that include three key sets of structural elements: activities, decisions, and flows. Table 5-1 shows the objects, a brief description, and their graphical shapes. There is a pair of Activity objects (**Task**, **Process**), a pair of Decision objects (**Decision**, **Choice**) and a pair of Flow objects (**Phi**, **Connector**). Please look at the descriptions in Table 5-1 carefully.



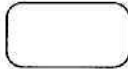





 **Task and Process**  ?? Work activities are represented by a hierarchy of **Task** and **Process** objects. A **Process** object may contain **Tasks** or even other **Process** objects. Thus a **Task** object cannot be broken down into a lower level of detail for purposes of business process modeling. Tasks are described through verb phrases that connote action and performance of work. These verb phrases include an action verb followed by a subject associated with the action; for example, *ship package*, *assemble bicycle*, *review insurance claim*, *diagnose telephone network problem*.

TABLE 5-1 KEY OBJECTS IN ACTIVITY DECISION FLOW DIAGRAMS

Types of Objects and Graphical Shape	Description
ACTIVITY Objects	Work Activities are represented by Task and Process objects.
Task  (rounded rectangle)	A Task represents a low-level activity which takes place within a Process. It has a cost and duration associated with it and employs the resources (e.g., employee or software) of a particular group or organization.
Process  (square)	A Process object is a high-level activity that takes place in a Process. A Process object may contain Tasks or even other Process objects, creating a hierarchy (think of the Process objects as the branches of a tree and the Tasks as leaves on the branches).
DECISION Objects	During a Process, Decisions may be required that result in Choices that influence the routing of work.
Decision  (diamond)	A forking point in a flow that has two or more routing Choices.
Choice  (small octagon)	At a Decision point, a Choice must be made (choose one among several Choices) in order to identify the subsequent Tasks.
FLOW Objects	The flow of a process is represented by the flow of Phis through Connectors.
Phi  (Greek letter)	A Phi (rhymes with tie) is an input/output object that is simultaneously the output of one activity and the input to another. Phis are what flow between activities. Phis can be physical objects or information in paper or electronic form. Put the letter I (Input) over the letter O (Output) we get the Greek letter O (Phi).
Connector  (arrow)	A transport method (such as truck, courier, electronic mail) used to transfer a Phi from one activity to the next. A Connector has other attributes that define it besides its medium (such as transfer duration)

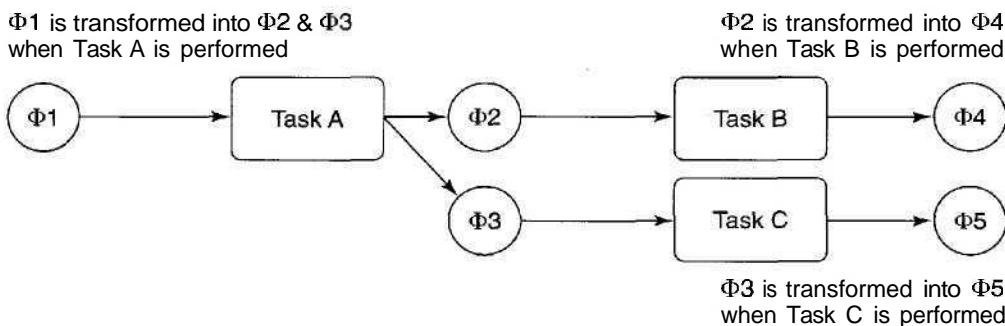


FIGURE 5-3 How Phis, Tasks, and connectors work

Phi and Connector \longrightarrow ?? A Phi (rhymes with tie) is an input/output object that is simultaneously the output of one activity (**Task or Process**) and the input to another. The flow of a process is represented by the flow of **Phis** from one task activity to the other through **Connectors** (see Figure 5-3). In other words, a **Task** represents the work activity that is performed to transform a Phi from an input Phi to an output **Phi**. A **Connector** represents a transport method used to transfer a Phi from one activity to the next. **Phis** and **Connectors** (the flow objects) are the way that the interdependence between **Tasks** is captured and preserved and there can be no **Tasks** that are not connected to **Phis**. Every **Task** that is performed transforms a Phi. The process is thus modeled as a networked flow of **Phis** that goes from left to right on a timeline.

Phis are nouns (things, stuff, data) that can be moved around. You know that you have identified an input **Phi** for a **Task** when its absence will stop the **Task** from being carried out. As a Phi progresses through a process, a description of its transformed state can be attached to its original name, thus becoming a noun with a describing adjective; for example, *a service call (the Phi) for repair is transformed into an assigned service call after it is assigned to a technician. After the repair is performed and completed, the Phi is transformed into a completed repair call.*

When a Phi "arrives" to a **Task** and becomes available, it brings two inputs: (1) an implied trigger for the **Task** to start and (2) an input that needs to be transformed; for example, *an insurance application that arrives in paper form to an insurance clerk's department carries in it the information that needs to be processed to transform this application into a reviewed application. However, the appearing of the paper form itself is also a trigger for the activity to start.* **Phis** can be classified into types depending on which of the two sets of inputs we focus on. If we classify **Phis** based on what gets transformed, then **Phis** could be (1) *physical objects* (electronic parts, tennis racket, hamburger) or (2) *information objects* (EDI invoice, repair order, voice message stock quotes) or (3) *knowledge objects* (product idea, repair problem diagnosis, software). If we classify **Phis** based on triggers, then **Phis** could be (1) *physical* (paper, spare part) or (2) *electronic* (E-mail, voice message). Thus a product design idea would be a physical Phi in this latter type of classification but would not be in the former one. The latter type

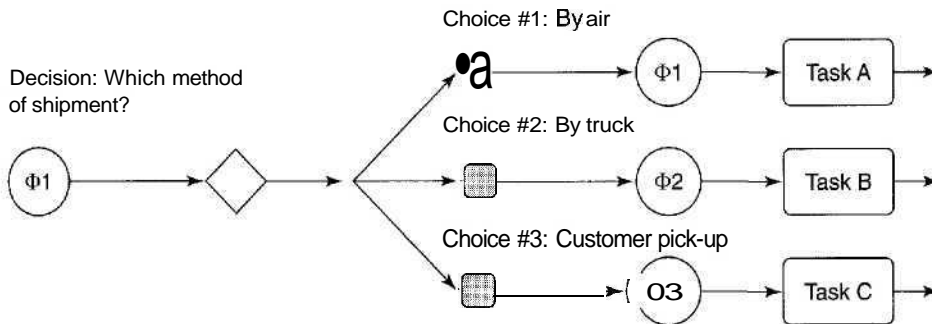


FIGURE 5-4 Modeling decisions and choices

of categorization of **Phis** is useful for identifying coordination and hand-off bottlenecks through the modeling of the business process.

Connectors represent the route and medium through which **Phis** are transported. The medium is not the message! For example, *the same paper document could arrive via a physical medium such as the postal service or a courier or via an electronic medium such as fax.*

Decisions and Choices ☐ ?? A **Decision** object is required when it is necessary to model an external or internal environmental condition that influences the flow of work. A **Decision** object is described in the form of a question that is asked and whose answers are modeled as Choice objects; for example, a **Decision** might be "Which method of shipment?" and the **Choices** might be by air, by truck, or customer pick-up. This is graphically represented in a process flow model as shown in Figure 5-4.






Secondary Objects In addition to the three pairs of sets of key objects for activities, decisions, and flows, there is a set of secondary objects. These objects do not alter the basic ADF paradigm but add needed convenience for modeling. Table 5-2 shows these objects, a brief description, and their graphical shapes. They are self-explanatory and you will see their role even more clearly when you build your own Activity Decision Flow diagram using BPR software.

5-4-2 Building Block #2: Linking Resources to Activities

The modeling method must also provide a way for defining resource types, allocating them to parts of the process, and accounting for their use. This is one of the distinctions that makes it a business model rather than just a graphical one.

A **Resource** in the context of a business process model is responsible or has an impact on performing a **Task**. The modeling method must provide a way of specifying which **Resources** are linked with which **Tasks** and for how long a period of time. It is also necessary to have a way of specifying the **Resources** that are allocated to an **Organizational Unit** (department). For example, *the modeling method must capture the*

TABLE 5-2 SECONDARY OBJECTS IN ACTIVITY DECISION FLOW DIAGRAMS

Types of Objects and Graphical Shape	Description
External Entity  (oval)	An entity that is outside the organization (customer, supplier) that receives an output or generates an input to the Process.
External Process  (oval within an oval)	An activity performed in the Process by an External Entity (service provider, partner). Although External Processes are outside the control of the organization that owns the Process, they are needed in the Process model for performance measurements.
Go To  (a star)	Indicates a shortcut for a Connector that would otherwise stretch over too long a distance in the diagram (would be ugly and distracting). Also provides a convenient way of modeling a loop (e.g., rework) within a Process.
Stop  (a traffic stop sign)	A graphical marker (i.e., has no data attached to it) that visually shows that a particular path within the Process has ended.
 Annotation (a sticky note)	A yellow sticky note to write comments.

fact that two shipping clerks are allocated to the shipping department as well as link the clerks to the tasks that they perform in the process.

For purposes of modeling, it is useful to categorize **Resources** into work participants (people, software, robots) and work aids (machines, tools, facilities, consumables, and various types of services). Each resource has a cost rate attached to it. The length of time that a **Resource** is allocated to a **Task** will determine the cost that the **Resource** contributes to that **Task**. More than one resource can be allocated to a **Task**.

5-4-3 Building Block #3: Rules of Graphical Connection

The modeling method must incorporate a system of logical rules for connecting activities such that this system of rules can enable the users of the model to build and modify

FIGURE 5-5 Linking drawing and definition of objects



process designs and configurations graphically. Examples of such rules are that time line arrows can only go from left to right; **Tasks** must have both input **Phis** and output **Phis** graphically attached to them; and all objects in a diagram must be graphically connected.

The modeling method must also have a way of linking the definition of objects and their drawing. An object can be drawn with a graphical shape but remain undefined. Defining an object in an activity diagram requires naming the object and assigning attributes or information to it. When an object is both defined and drawn, only then can it be identified within the context of the process model.

Let us next illustrate how modeling methods enable us to build a business process model using the Holosofx software before examining the two remaining building blocks.

Familiarizing Yourself with the Holosofx Workflow·BPR Modeler Software

Before proceeding to start learning how to model a process, here is what you need to do to familiarize yourself with the Holosofx Workflow·BPR software:



1. Go to the Appendix of this book and follow the instructions for installing the software on your computer. This should take about 15 minutes.
2. From Windows **Start** button  choose **Programs–Workflow BPR-WFBPR Help** as in Figure 5-6. The Help Files will appear in Internet browser format.

FIGURE 5-6 Starting Workflow BPR help



3.  Click on **Getting Started**. Get familiar with the contents of the WFBPR directory and how to open and close files. This should take no longer than 15 minutes.
4. While still in the Getting Started section of Help, go through a tour of the software's menus, learn how to navigate inside Activity Decision Flow (ADF) diagrams, and understand how data dialog boxes work. This should take about half an hour.

ting Up to Start Modeling a Business Process

When you are ready to experience how modeling methods enable us to build a business process model, do the following:

Step 1 From Windows **Start** button  choose **Programs–Workflow BPR–WFBPR 3.4**.


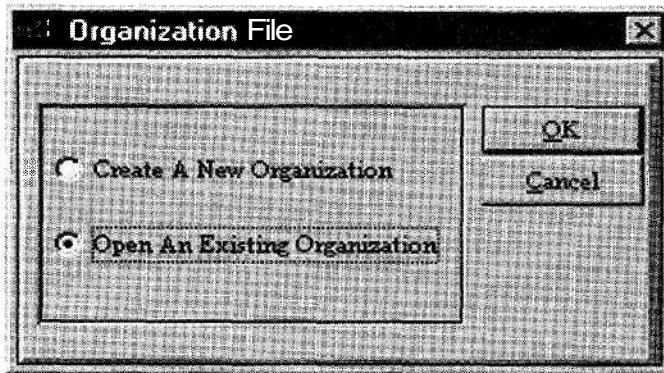




Step 2 *Find and open the "Mini Tutorial" Organization File:*  Select the **Open An Existing Organization** option from the **Organization File** dialog box that appears when Workflow.BPR is first opened, and click on OK button.


FIGURE 5-7 Organization file dialog box



 **The Open Organization** dialog box appears showing the sample organization files that came with your CD-ROM. Select the "MiniTtrl" directory that was installed in the Samples sub-directory of the WFBPR directory from the directory list.

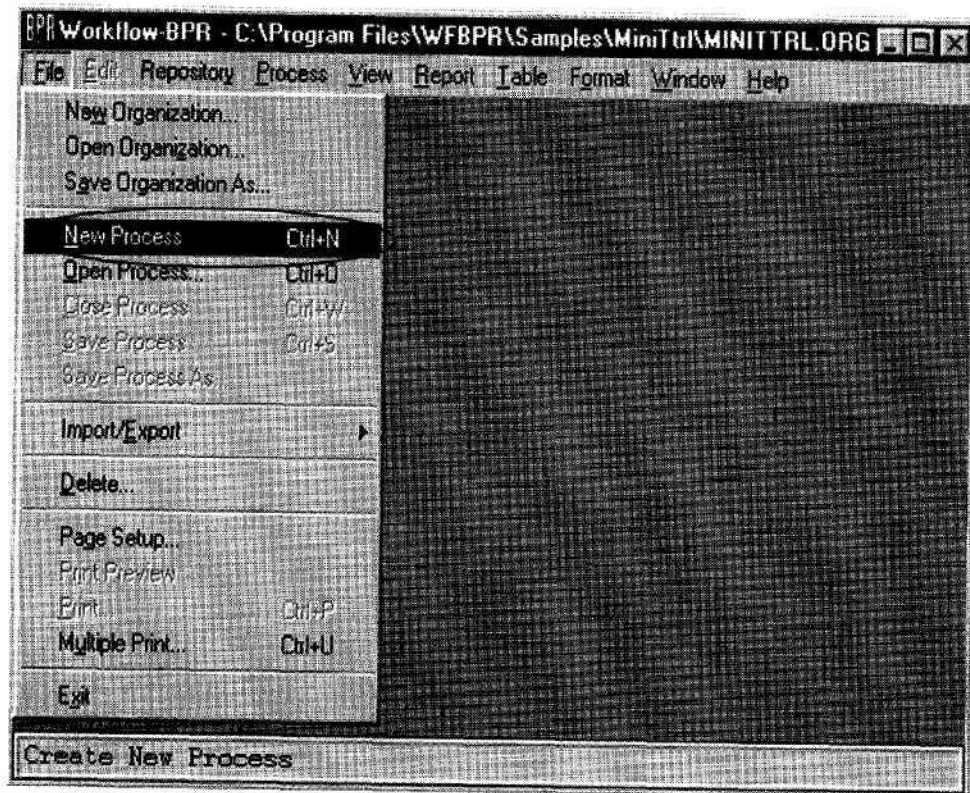
Step 3 *Open the "Mini Tutorial" Organization File:*  Select "MINITTRL.ORG" in the **File Name**.

 Click on **Open** or  press **Enter** and the "MINITTRL" organization file is opened. We can now access any existing process models or create new process models within that organization file.

Step 4 *Create a Container for a New Process Model Inside the "Mini Tutorial" Organization File:* © When the "MINITTRL" Organization File is opened, the **Open Process** dialog box appears. There is one Process File listed in the dialog box: "Pack Customer Order." *Do not open this Process File at this time.*  Click **Cancel!**

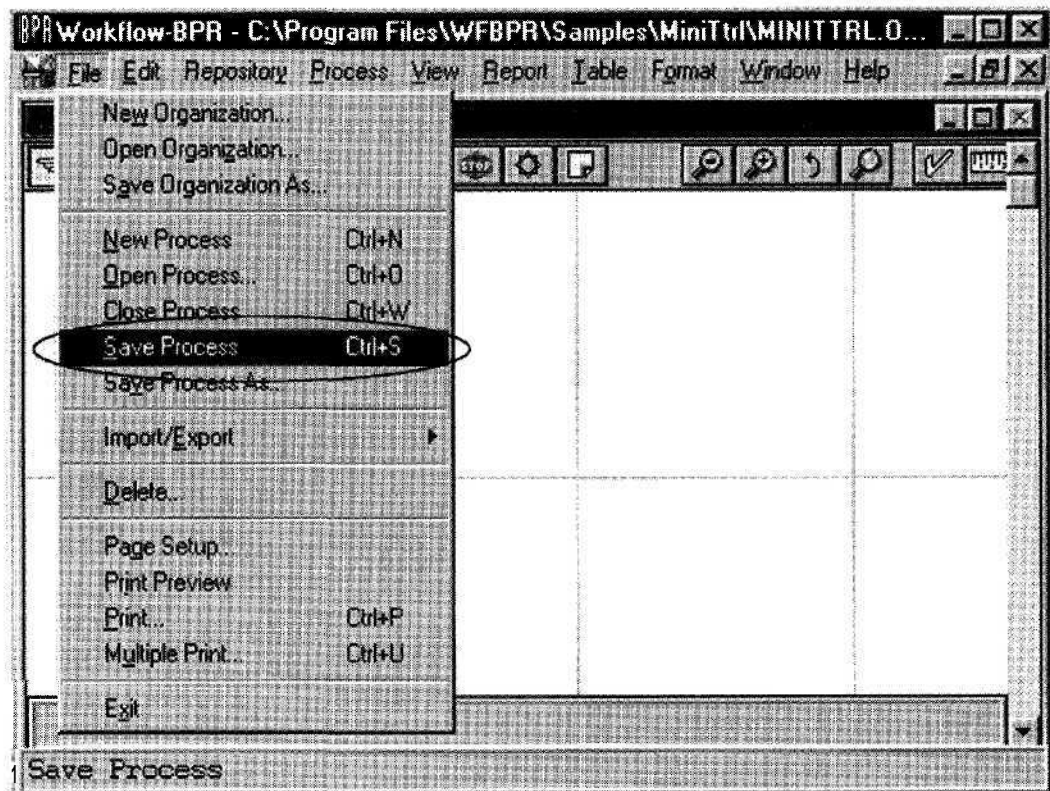
From the **File** Menu, choose **New Process** as shown in Figure 5-8. An untitled Process File is created and opened and the Activity Decision Flow diagram grid appears.

FIGURE 5-8 Creating a new process



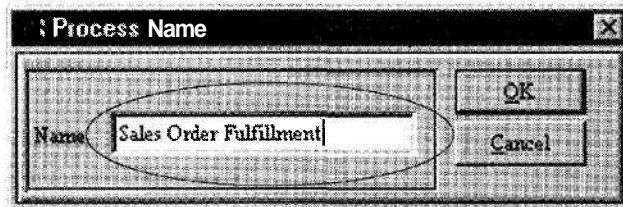
☞ Select **Save Process** from the **File** Menu as shown in Figure 5-9 and the **Process Name** dialog box appears as in Figure 5-10.

FIGURE 5-9 Saving a process



☞ Type "Sales Order Fulfillment" in the **Name** box, and ☞ click **OK** to name this new process.

FIGURE 5-10 Renaming a process




☞ The name in the title bar will now be updated to "Sales Order Fulfillment." This is the process that we will use to learn how business process modeling works.

Building a Process Model for the Sales Order Fulfillment Process


Let us now build a process model for the "Sales Order Fulfillment Process" through the Activity Decision Flow diagram, which is a blank grid at this point. When you have finished building the model, the Activity Decision Flow diagram should look like the one in Figure 5-14. By looking at Figure 5-14, you can also infer how the "Sales Order Fulfillment Process" works. From left to right, when an order is received from a customer, it takes a different path depending on the type of order. This process starts with a trigger from the customer and ends with a deliverable to the customer.

To facilitate building the model, some of the data for that process are already stored in the data repository. Shown on page 126 after Figure 5-14 is a set of tables that displays the names and data attributes of the (activity decision flow) objects and linked resources that you will be drawing and defining. When the data are already stored in the repository, all that is necessary to define the object is to select the existing data through the data dialog boxes after clicking on the object drawing. These data are marked with an asterisk (*) in the tables. Other data have not been stored in the repository and must be entered through the data dialog boxes.

To further facilitate building the model, an additional annotated ADF Toolbar is displayed in Figure 5-14 with dotted lines that indicate which tool should be used to create which object in the diagram.

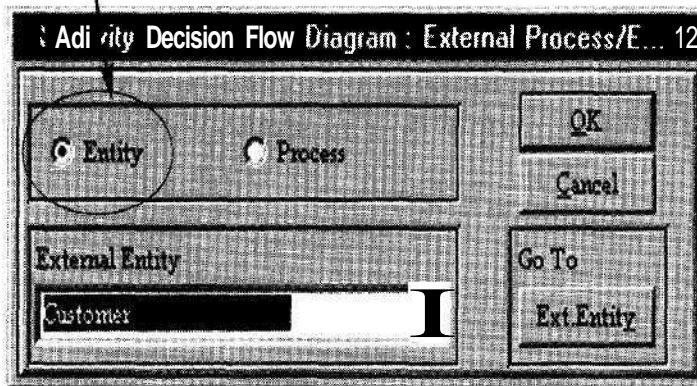
Step 1 Draw the Process Elements and Connect the Flow: To draw process elements, use the appropriate tool from the ADF Toolbar to insert the objects in the Activity Decision Flow diagram in the same pattern as displayed in Figure 5-14 going from left to right. Connect the objects in a left-to-right order using the **Connector** tool as demonstrated in the diagram. First, click the **Connector** tool button () and then connect objects. You need to drag your mouse from the source object (the object where the arrow starts) to the target object (the object where the arrow ends).

Note that when drawing the objects without defining them, they will appear without names at first as shown in Figure 5-15. Similarly, **Phis** will appear as plain Φ s rather than bitmapped color icons.

Step 2 Define the Name and Attributes of Each Object: Defining the object can be done by selecting data that have been stored in the repository or by directly entering new data in the dialog box for that object. To define the name and data attributes of an object, click on the **Pointer** tool button () and then double-click on the object to bring up the appropriate dialog box. Use the data in the tables after Figure 5-14 to define the objects through the attributes that you have been given data on. An example of a Phi dialog box is shown in Figure 5-16.

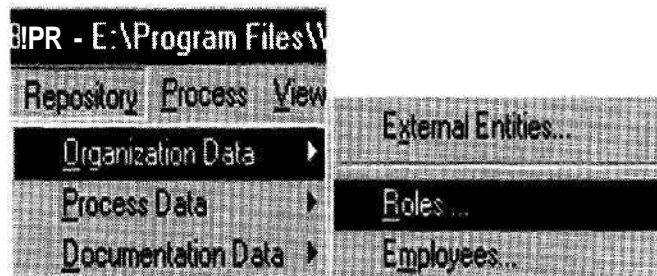
Tips for defining objects:

1. When you define the External Entity "Customer," make sure that you select **Entity**, not **Process**.

FIGURE 5-11 Defining customer entity

2. When you enter attributes of objects, click the drop-down list box to select the items already stored in the repository. You need to type in the item name directly in the dialog box if it is a new item.

3. In order to input the standard cost for the "Order Processing Clerk," choose **Repository-Organization Data-Roles** from the Menu. (Make sure that you already entered "Order Processing Clerk" as the Role attribute of the Task "Enter Customer Order.")

FIGURE 5-12 Starting defining roles

4. Select "Order Processing Clerk" in the **Roles List**. Enter "500 / Week" in the **Standard Cost** and select "U.S. Dollar" in the **Currency**.

FIGURE 5-13 Roles definition dialog box

The screenshot shows the 'Repository : Roles' dialog box with the 'General' tab selected. The 'Name' field is 'Order Processing Clerk'. The 'Standard Cost' field is '500.00' and the unit is 'Week'. The 'Currency' dropdown is set to 'U.S. Dollar'. The 'Roles List' on the left shows 'Order Processing Clerk' selected. Buttons on the right include OK, Cancel, Clear, Update, Delete, Employee, Currency, and Calendar.

Step J Define and Link Resources to Activity Objects: Through the data dialog boxes, resources are defined and linked to **Task** objects. Note that for purposes of this simple model, many of the fields in the data dialog boxes are left at their default values.

Step 4 Verify the Graphical Connection Logic: The rules of graphical connection are built into the software and much of this happens automatically. If you violate some of the rules in your graphical connections, a message will appear telling you why you cannot do intended action. The rest of the rules can be checked through the **Validate** tool on the ADF Toolbar.

Click the **Validate** tool button () and the **Validation** dialog box will display any remaining structural modeling errors. It checks that all of the elements in your diagram are consistent, complete, and logically correct. Thus it ensures that every object has been defined with at least its minimal attributes, and is logically connected to another through a connector. It also checks logical object sequences; for example, an External Entity cannot be in the middle of a process—it must be changed to an External Process. Try deleting a connector and see what happens.

Housekeeping Step: Save the Process Model: When you are done, the ADF diagram should look like Figure 5-14 and have all the elements defined. To save your process model, choose **Save Process** from the **File** menu.

FIGURE 5-14 The "sales order fulfillment" process model (both drawn and defined)

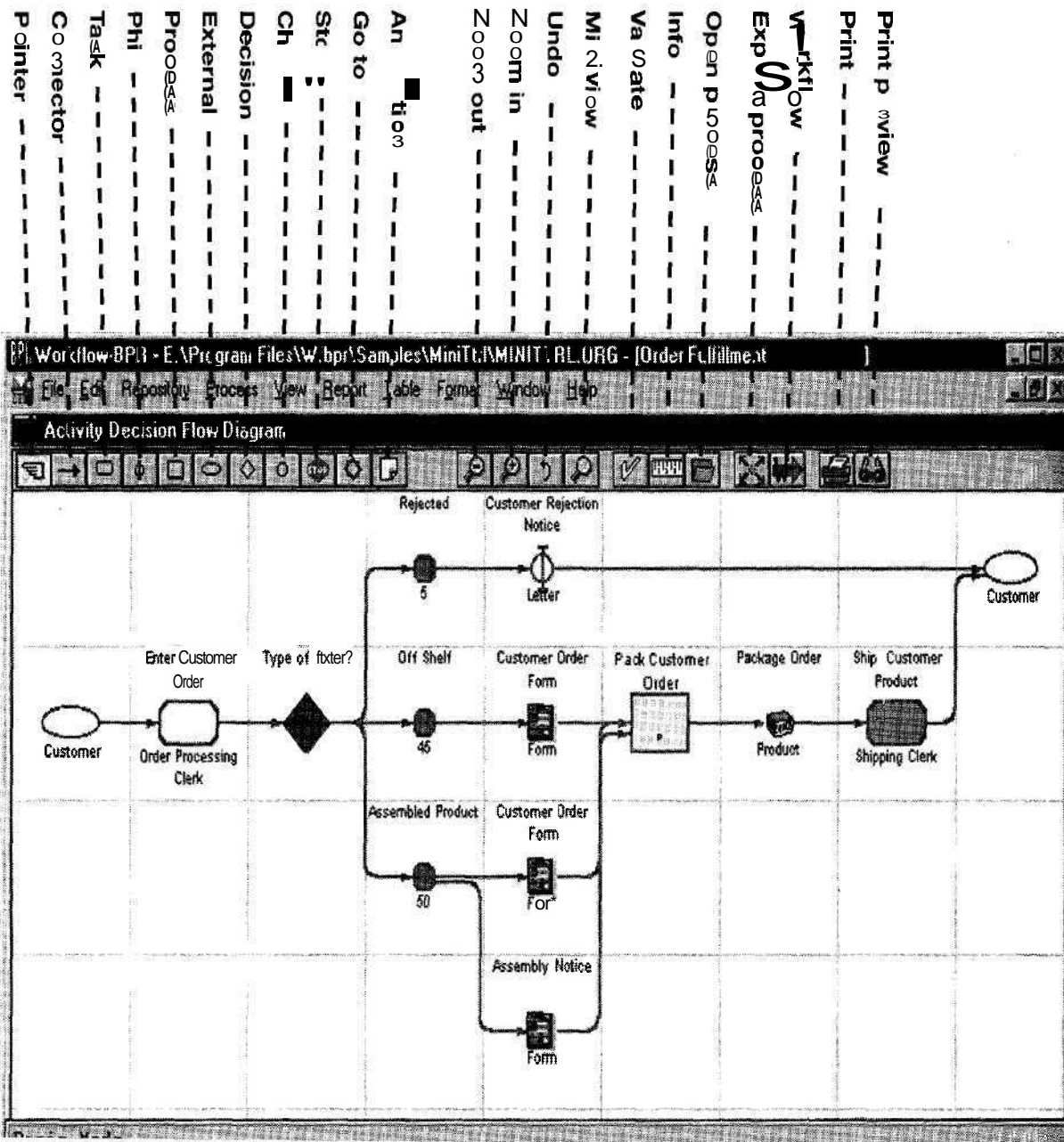
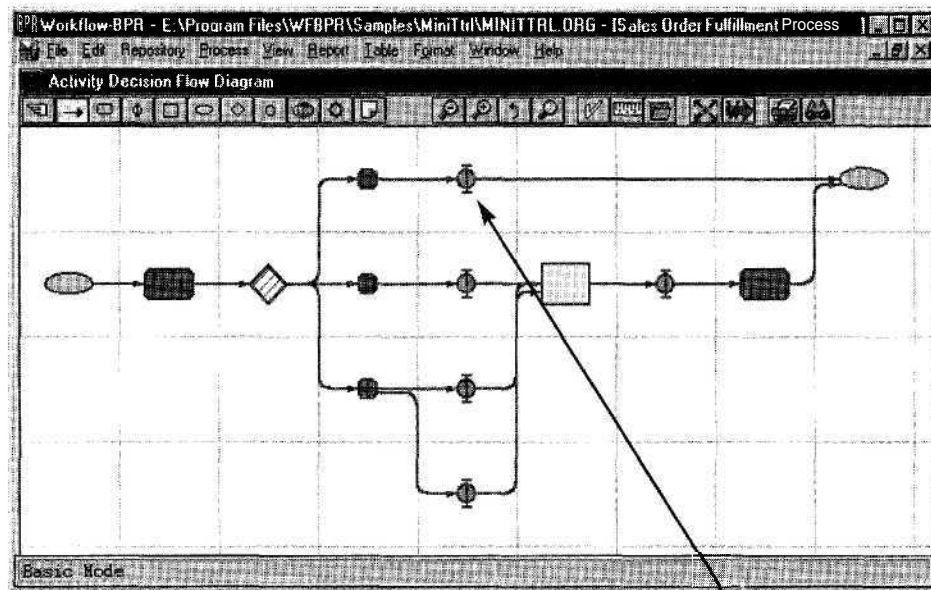
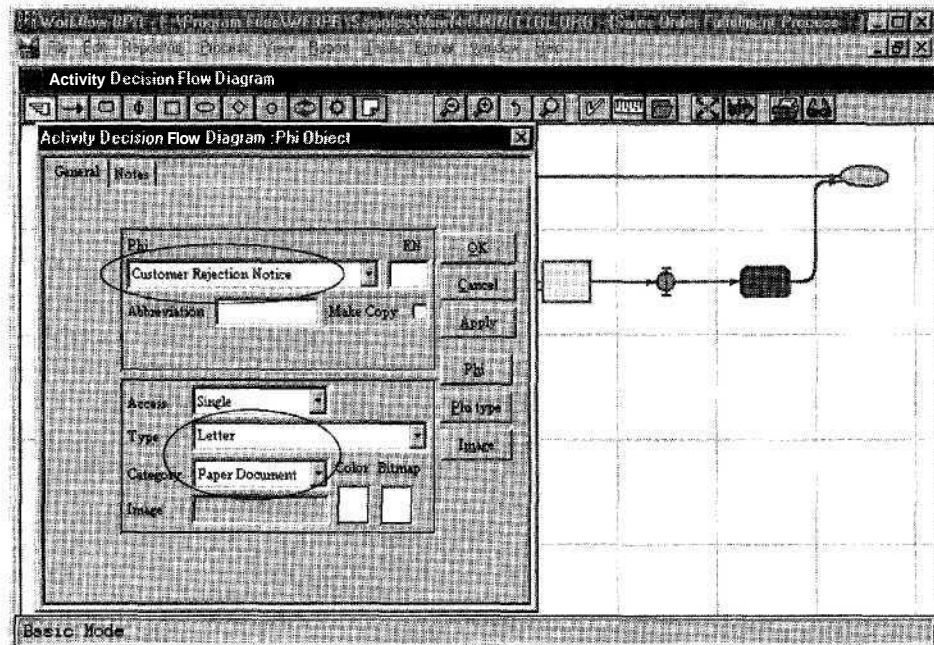


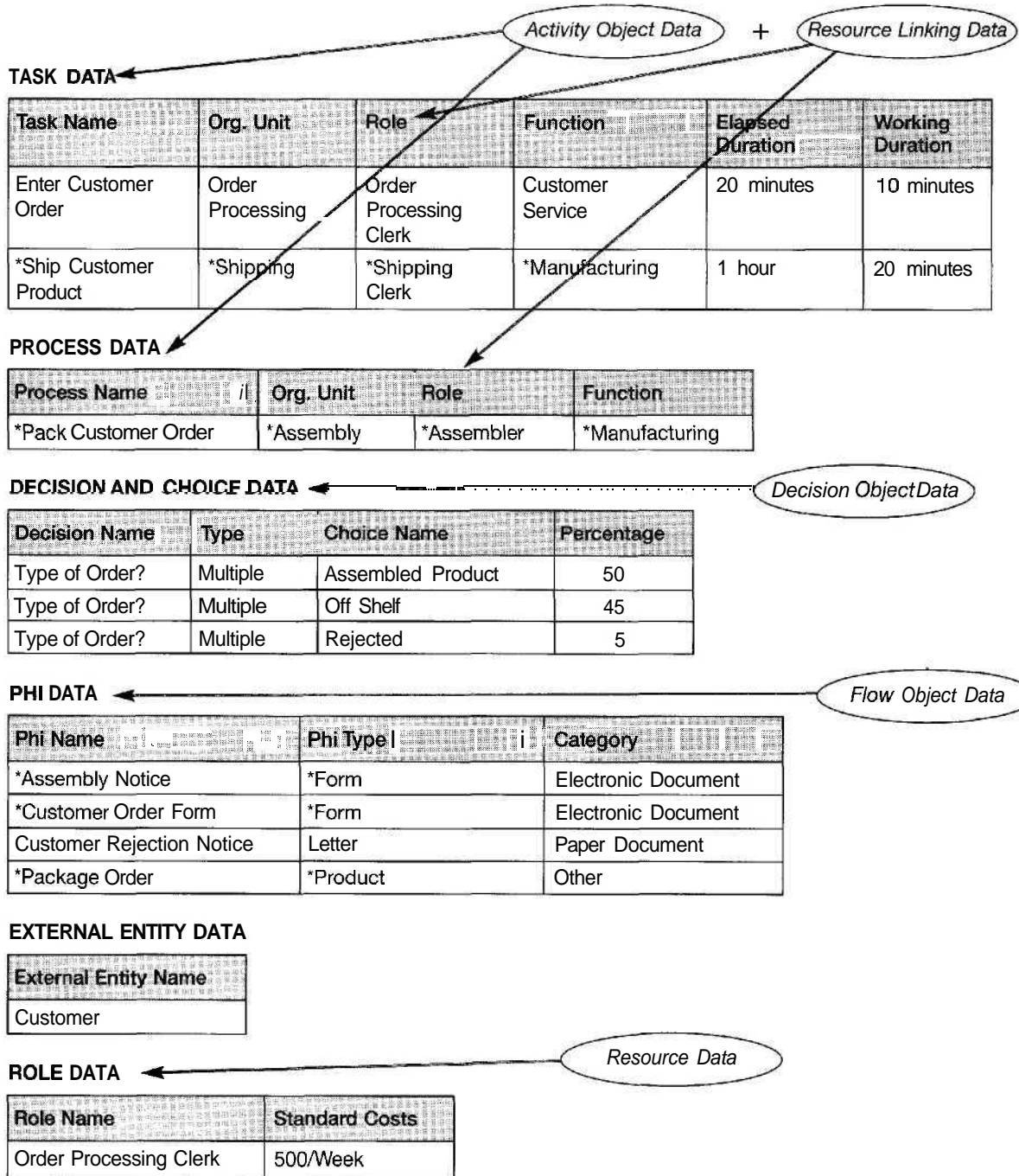
FIGURE 5-15 The "sales order fulfillment" process model (drawn only)

FIGURE 5-16 Defining a drawn phi object through a data dialog box (⌘ click on the drawn Φ)

Tables of "Sales Order Fulfillment" Process Data

Items that are marked with an asterisk (*) are already stored (and defined!) in the data Repository of the Organization File; these items can be selected through the combo

boxes in the dialog boxes of the objects. The items that are not marked will have to be typed directly into the combo boxes in the dialog boxes of the objects; these items will then be automatically stored in the Repository.



Have We Finished the Modeling of the Business Process Yet?

No! and for at least two reasons. First, there are many other attributes that we could have added for each of the objects that we defined in the model. Just look into a data dialog box for any of the objects and you will see the variety of additional attributes that can be used to describe objects. For example, double-click on any of the **Connectors** and you will see that there are other attributes that can be defined: medium, transfer duration, calendar, allowing much more sophisticated modeling if needed. Second, we have not yet examined the two remaining building blocks of the modeling and analysis method. Let's do that next.

5-4-4 Building Block #4: Activity Path Management Capabilities

A business process model with **Decision** and **Choice** objects represents a business process that can be performed in more than one way depending on conditions. Each way that the process is performed comprises a different set of activities and different paths. Thus a process model captures all the possible paths of activities and is a container of possibilities. However, only one path of activities is followed when the process is performed. Each of these unique paths of activities is termed a **Case**. Thus a business process modeling method must provide a capability for conditional concatenation of activities (like a chain) to form a logically correct, connected, end-to-end path for each set of **Decision** and **Choice** combinations.

In order to make this dynamic aggregation possible, several capabilities must be part of the modeling method and are embedded in a BPR software package. Because they are embedded in the software they occur automatically, but it is important for you to understand the idea behind the key ones and how they change the power of the business process modeling method.

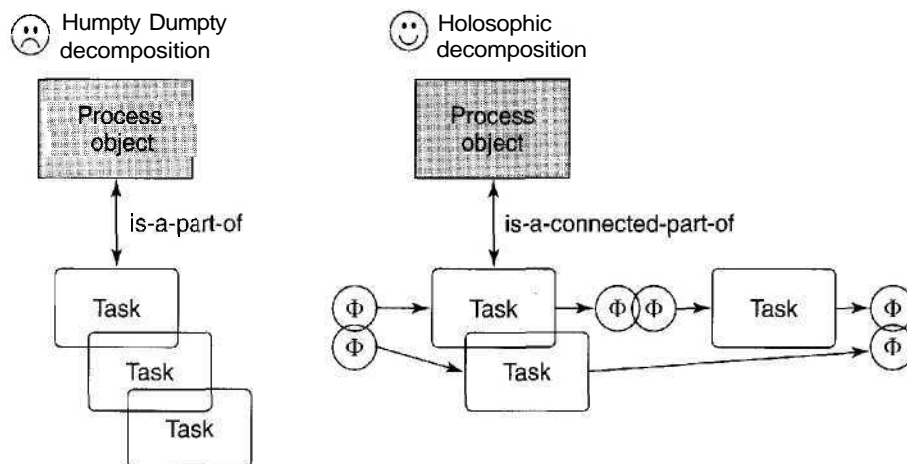
Path Selection Rules. There must be path selection rules in the modeling method to enable correct activity paths and to disable incorrect activity paths when conditions are changed. Here is an example of a simple rule: Paths without **Decision** objects are always enabled. However, paths originating from selected decision **Choices** are enabled while paths originating from decision **Choices** not selected are disabled. Here is an example of a more complicated rule: If a disabled path is joined with an enabled path, their common path is enabled and the joining disabled path remains disabled apart from its juncture with the enabled path.

The beauty of computer software is that it can manage complicated rules in a way that is virtually transparent to the user. Because the path management of the process model is managed by the BPR software, however, you must be careful when you are defining **Tasks** in your process model that the **Tasks** describe the work performed rather than manage the workflow path. The path management capability is already built into the structure of the software, and *defining **Tasks** that invoke process control of the workflow paths can violate this feature and should be avoided.* **Tasks** to be avoided in modeling are conditional tasks that schedule or change the priority of subsequent tasks or the structure of a path. These are modeled using **Decisions** and **Choices**.

Smart Dynamic Concatenation of Activity Objects. To concatenate is to link together in a chain. The modeling method must incorporate a way of linking together process elements into an end-to-end chain with a variety of parallel paths. It must accomplish this with process elements that have dynamic interdependencies that change with each Case. This requires a smart method for making sure that, when the process elements come together, they are the correct ones (!) for those conditions and that the logical integrity of the model of the end-to-end process is preserved.

This is a tricky issue and a differentiator among BPR software packages that can handle both structured workflow and dynamic interdependence (see Figure 5-2 earlier in the chapter). One of the biggest problems in traditional hierarchical decomposition is that once you break down a structure into parts and work on them in different ways, it can be very difficult to put them back together again as one coherent functioning whole, especially when the interdependence between the parts changes depending on sets of conditions that also interact together. I call it the **Humpty Dumpty effect**. A popular children's nursery rhyme tells about the fictional egg-shaped Humpty Dumpty falling off a wall and breaking into pieces—all the King's horses and all the King's men are not able to put him together again. A dynamic network flow structure is trickier to decompose into logically "recomposable" parts than a static inanimate object such as a building, a car, or a birthday cake whence the interdependencies are fixed and spatial. It must also be aggregated horizontally over a timeline rather than vertically like a static hierarchy. In order to be able to break a process model into parts so that we do not get a Humpty Dumpty effect (cannot put it back together again correctly), we need to somehow preserve the sequenced interdependencies among the activities after we break it down. Here we begin to see how the representation of process flow microstructure (Building Block #1) will have an influence on how smart concatenation can occur.

FIGURE 5-17 Two types of decomposition



In order to avoid the Humpty Dumpty effect, Holosofx's Workflow BPR software has a very clever concatenation method that is based on “holosophic” decomposition (*holo* means whole, and *sophics* means wisdom or smarts). Holosophic decomposition always preserves the integrity of the whole under dynamic conditions, even when the interdependence among parts changes through the way that **Tasks** are defined as intertwined with **Phis** and **Connectors**. *What makes this possible is that the modeling method defines the “part” as not the Task, but rather the Task with its connected incoming and outgoing Phis and Connectors* (see Figure 5-17). As also illustrated in Figure 5-17, the formal relation between the whole and the parts is “A-CONNECTED-PART-OF” rather than just “A-PART-OF.” Thus decomposition of the process model structure into smaller parts is only allowed to take place at **Phi** boundaries, making the **Phis/Connectors** redundant in connecting parts and consequently always preserving the interdependence of the whole in each part—and we are sure that we will not get a Humpty Dumpty effect.

Let us now examine the Cases in the “Sales Order Fulfillment Process.”

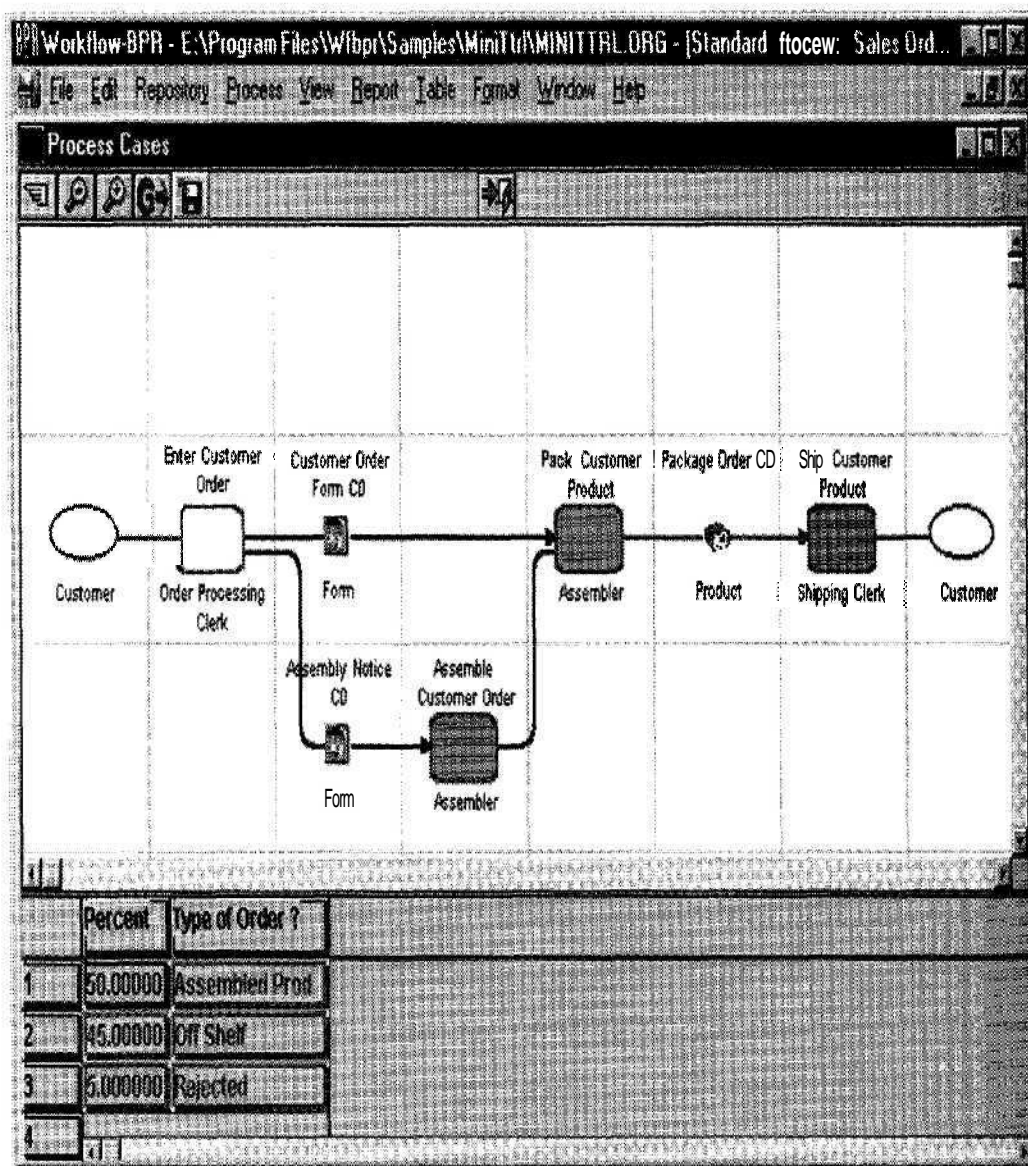
As you can see from the ADF diagram (see Figure 5-14), it is possible to perform the Process in three ways. The **Decision** has three **Choices**, each of which results in a different activity path. *Only one path of activities can be followed when the Process is performed.* Each individual path is called a **Case**. Each **Choice** has a probability of occurrence (5%, 45%, 50% in this example), which means that the path taken by the **Choice** will have that probability. In a more complex process, a path can divide into more paths as additional Decisions occur in the Process.

It is important for analysis to isolate individual Process Cases. Apart from being able to verify the process by walking through the activities of a particular case, it is vital to be able to examine the impact of different cases on overall process performance.

Step 5 Review Cases in Process Model ☞ Click the **Expand Process** tool button (☒) in the ADF Toolbar to open the Expanded Process Cases Window, which displays an expanded version of the Process. You will notice that lower-level tasks that were hidden inside Process objects will now be brought up to the top level and are visible (for example, the **Tasks** inside the **Pack Customer Order Process**). This is an interim step and the resulting diagram is not yet very helpful.

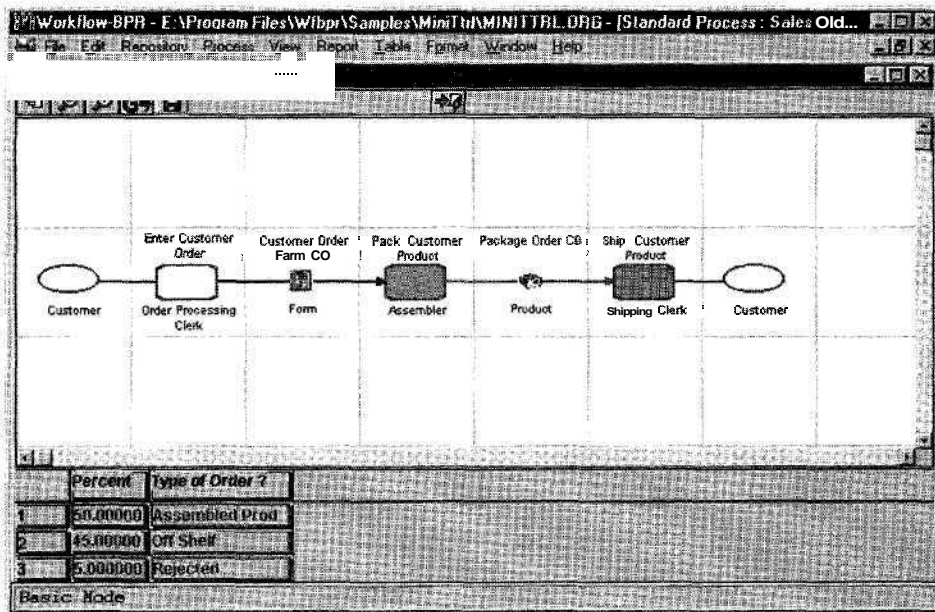
Click the Process Cases tool button (•) in the toolbar in the Expanded Process window. The Select Number of Cases dialog box appears and prompts you to determine whether to display all the cases or a subset of them (the default is to display all cases). Click OK to choose all cases. The Process Cases Window appears.

FIGURE 5-18 Process cases window: Case #1



To view a **Case**, click on its row in the case table. It will be displayed in the case window and you can now examine it. You can also create a Generated Case File for an individual **Case**. By opening a Generated Case File, further analysis of the **Case**, such as scheduling, can be performed as we shall see in Chapter 6.

FIGURE 5-19 Process cases window: Case #2



5-4-5 Building Block #5: Process Performance Measurement

Now that you have modeled your process and reviewed its cases, you are ready to do some analysis. The modeling method used in the software makes possible a variety of process performance calculations and enables asking what-if questions.

Both structural static analysis and event-driven dynamic analysis should be possible with a good BPR modeling method. The structural static analysis is usually based on time, cost, and resource analysis of **Process Cases**, while the dynamic analysis necessary for understanding process capacity and resource availability is done through simulation. Both of these analysis capabilities are embedded in the HoloSox software.


Step 6 Do Process Case Analysis: Your Process Model consists of three **Cases**. The time and cost of each of these three possible ways to perform the "Sales Order Fulfillment" Process can be calculated. Because each **Case** has a different probability of occurrence, the

time and cost of each **Case** will have a different impact on the overall time and cost of the **Process**. Therefore the time and cost of the three **Cases** do not have the same weight when calculating the average time and cost of the **Process**. The software can calculate a weighted average for the time and cost measurements of the entire **Process** that multiplies (i.e., weights) the time or cost of each **Case** by the probability of its occurrence and adds them together. It can also calculate the time and cost of each **Case**.

© Let us now calculate the weighted averages of the "Sales Order Fulfillment" Process:

☞ If you are still in "Process Cases" window (Figure 5-19), go back to the ADF diagram window (Figure 5-14) by clicking **Exit** button (SB).

☞ Choose **Report-Calculate Averages** from the menu. The **Calculate Averages** dialog box will appear, with "Sales Order Fulfillment" highlighted in the **Process Name** list.

☞ Click **OK** or  press **Enter**. The **Calculate Average of Sales Order Fulfillment** dialog box appears, displaying a thermometer showing the progress as **Cases** are added to the calculation. The Announcement message box appears when the calculations are complete. For this simple example, if you have a fast PC (say with a Pentium II or III chip) it may happen too fast for your eye to catch it.

☞ The averages for the "Sales Order Fulfillment" Process have been calculated, and the reports that summarize the time, costs, and other metrics are available for viewing.

☞ To view the **Process Costs Report** that shows the average cost of the Process and the cost of each possible way to perform the Process (the Cases):

☞ Choose **Report- Costs- Cases Total Costs** from the menu.

☞ The **Weighted Average Reports** dialog box appears with the "Sales Order Fulfillment" Process highlighted in the **Process Name** list and the "Cases Total Costs" Report highlighted in the **Report Name** list.


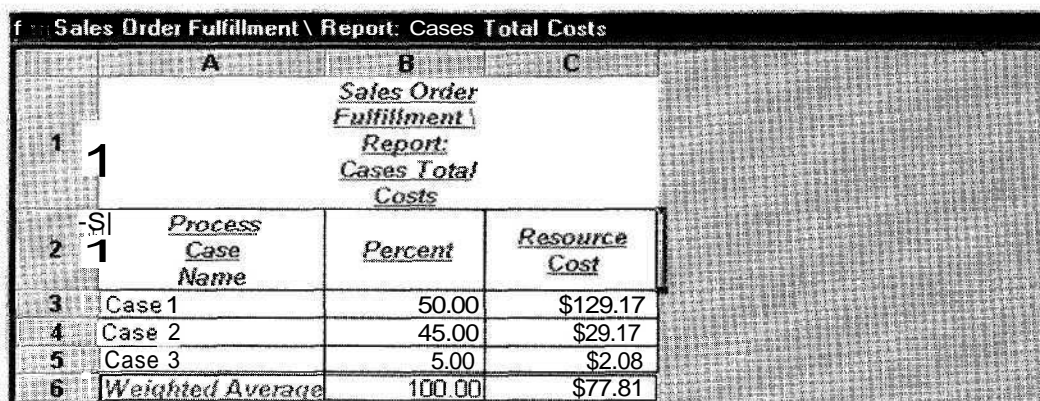
☞ Click **OK** or  press **Enter** and the **Cases Total Costs** Report appears as in Figure 5-20.

FIGURE 5-20 Weighted average calculation of costs for sales order fulfillment process



	A	B	C
1	1	<u>Sales Order Fulfillment \</u> <u>Report:</u> <u>Cases Total Costs</u>	
2	<u>Process Case Name</u>	<u>Percent</u>	<u>Resource Cost</u>
3	Case 1	50.00	\$129.17
4	Case 2	45.00	\$29.17
5	Case 3	5.00	\$2.08
6	Weighted Average	100.00	\$77.81

© Let us now do some “what-if” analysis on the Process:

Go back to the Activity Decision Flow diagram for the Process.

Click on the "Assembled Product" **Choice** icon in the diagram and increase the percentage of that path from 50% to 65% to see what the effect is on cost of making more assembled products to order than delivering them off the shelf.

Click on the "Off Shelf **Choice** icon and change it to 30% (so that the sum of the three remains at 100%).

Repeat the steps used above to calculate the weighted averages and view the **Cases Total Costs** Report. You should get the numbers shown in Figure 5–21. The average resource cost of the process goes up from \$77.81 to \$92.81.

FIGURE 5–21 Weighted average calculation of costs for sales order fulfillment process when percentages are changed for what-if analysis

	A	B	C
1	Sales Order Fulfillment Cases Total Costs		
2	Process Case Name	Percent	Resource Cost
3	Case 1	65.00	\$129.17
4	Case 2	30.00	\$29.17
5	Case 3	5.00	\$2.08
6	Weighted Average	100.00	\$92.81

Step 7 Do Process Simulation Analysis: Simulation captures the dynamics of a process and software can show you how the process works through animation. In the Holosofx software, an **External Entity or Task** starts a Job by creating a **Phi**. As they move through the **Process** from one **Task** to another, **Phis** are placed into the next sequential “in-box” or queue. When a **Decision** is reached, a **Choice** is randomly selected based on its probabilities (as defined by the user during modeling). **Phis** travel until the **Process** ends.

The measurements provided by a Simulation analysis reflect a short period of time. It is used to spot bottlenecks where the process is slowed down and delayed because resources are not available. It identifies **Tasks** in the **Process** with the largest number of items in the queue.

© Let us now run a simulation on the "Sales Order Fulfillment Process:

Click the **Expand Process** tool button () in the **ADF Toolbar** to open the Expanded Process Cases Window, which displays an expanded version of the Process.

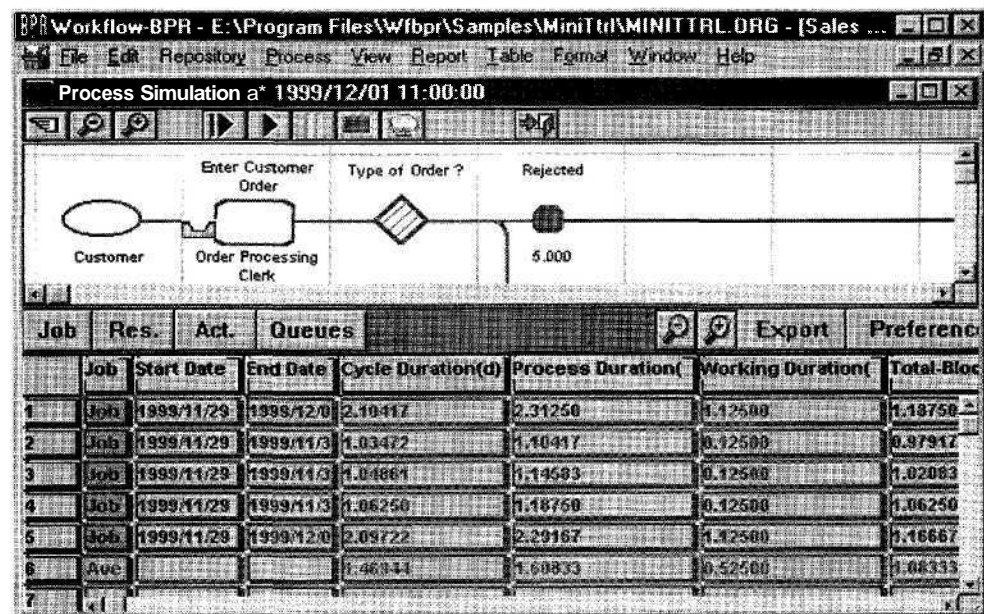
Click the **Simulation** tool button () in the toolbar in the Expanded Process window and the Process Simulation Window appears.

Click the **Run** tool button (Hi) on the Process Simulation **window toolbar**. The "Sales Order Fulfillment" Process will be simulated as shown in Figure 5-22. During the Simulation, jobs will be started that show the **Phis** moving between **Tasks**. Queues will be filled with the **Phis**, **Resources** will drop down to the **Tasks** to process the **Phis**, and the Simulation result tables will be updated dynamically.

To review the Simulation Analysis: Simulation analysis can be viewed during Simulation with the final results displayed immediately after. Note that the data will not be the same each time a Simulation is performed because the **Choices** for the **Decisions** are chosen randomly (based on their probability) and the working of the **Tasks** are chosen randomly (based on their mean and standard deviation). Try it and see for yourself.

Simulation will be discussed in more detail in Chapter 6; this chapter just gives you a sense of how it is used in BPR analysis.

FIGURE 5-22 Simulation window



5-5 RAMPING UP YOUR MODELING SKILLS

The previous sections provided an introduction to business process modeling and analysis with BPR software. You can ramp up your modeling skills by taking advantage of the extensive files and online tutorial that comes with the Holosofx CD-ROM.

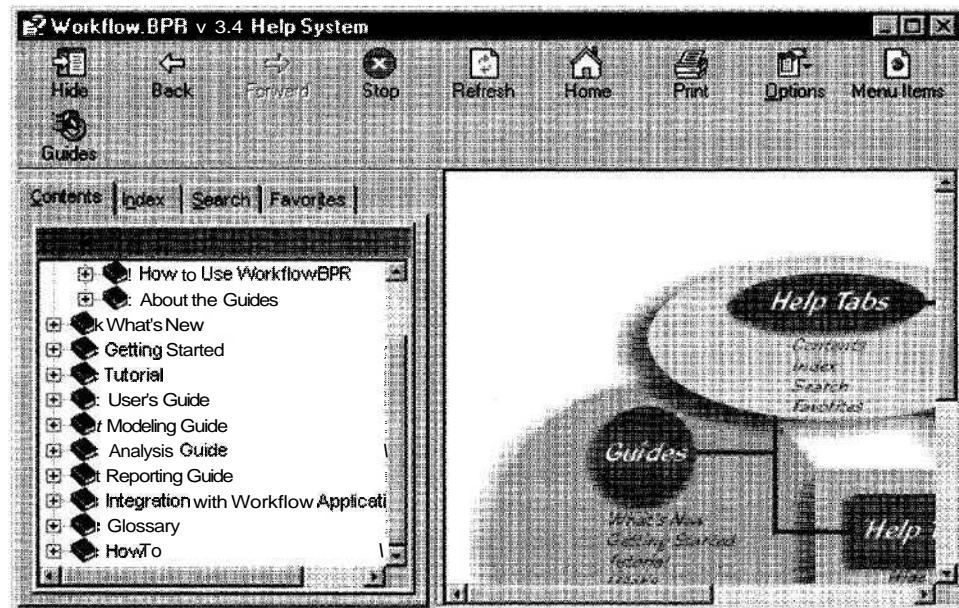
5-5-1 Taking Advantage of Holosofx CD-ROM Help Files

The Help function for Version 3.4 of the software has extensive navigation and search capabilities through the Internet Explorer browser, as well as a full glossary. Search is

possible by keyword (or Boolean combinations of keywords) or through the index as well through a Menu toolbar format. There is also a "Getting Started" section that provides installation information and a tour of the Workflow-BPR menus. The following guides are also included in the Help files (See Figure 5-23):

- User Guide: provides information on functionality, menus, and how to use the software.
- Modeling Guide: provides information related to modeling processes with the software.
- Analysis Guide: provides information on analyzing process models.
- Reporting Guide: provides information on how to generate tables, charts, and reports from process analysis with the software.
- Tutorial Guide: See next section.

FIGURE 5-23 Workflow.BPR help



5-5-2 Working through the OnLine Tutorial

The mini-tutorial in this chapter is sufficient to get started on learning how to use the software for modeling and analysis. If you would like to ramp up your modeling skills further, there is a detailed online tutorial on the CD-ROM that takes about four to six hours to complete. It is a hands-on self-paced tutorial that is the sales order fulfillment process for a supplier of product sub-assemblies. The tutorial guides you through the steps for modeling both the As-Is and To-Be process alternatives, and doing process analysis.

5-5-3 Process Modeling Tips

1. Do not bypass process scoping. This phase helps you think through the boundaries of the business process and its key issues. It provides excellent guidance for modeling a process appropriately. Bypassing this phase can be very expensive in terms of missed understanding.

2. Model a process, not a departmental function. Trying to model the tasks that take place in a marketing department is not good business process modeling. A business process cuts across departments and functions and delivers an outcome to a customer.

3. Model details iteratively. Start modeling the process with a rough cut, and then progressively add details as you shape the process map. Start simply and then populate the model as you progress. It is often unclear what data is needed before modeling the process. You can start top-down by defining sub-processes and then detailing them in turn, or you can start with the sub-process that is the most clear and then move up or laterally from there.

4. Take advantage of drill-down capabilities. The layered process and task hierarchy of tasks and processes allows the hiding of detail until it is needed. Hiding numerical detail can also be done through drawing and viewing options. The ability to add much detail but also to hide it allows better communication of process understanding.

5. Avoid needless loops. Excessive looping (through Go To or Decisions) is a sign of bad process design and can unnecessarily complicate the process architecture.

6. Take advantage of documentation capabilities. The software has several helpful documentation features including an entire repository for documentation data that includes policies, business rules, and procedures. This helps explain the process model and increase understanding among process teams.

7. Keep the process map clean and vivid. There are a number of aesthetic aspects that make process models easier to understand such as selecting vivid and representative bitmaps for the Phis and using colors to identify different enterprise units. Make your process maps easier to understand by keeping the number of crossing lines to a minimum.

8. Watch your names. Use active verbs for naming activities in a process model and keep names short and informative.

9. Engage and communicate. Engage process participants and owners in the modeling effort and communicate frequently.

6

ANALYSIS AND REDESIGN OF AN ENTERPRISE PROCESS

6-0 ANALYSIS AND REDESIGN ACTIVITIES

6-1 REDESIGNING THE CUSTOMER SERVICE PROCESS AT ZYCO INSURANCE

- 6-1-1 Skeletal Storyline and Process Scoping
- 6-1-2 Modeling the As-Is Baseline Process
- 6-1-3 Analysis and Diagnosis of the As-Is Baseline Process
- 6-1-4 Analysis and Redesign of the To-Be Process
- 6-1-5 Comparing As-Is and To-Be Processes
- 6-1-6 Analysis of What-If Scenarios Through Simulation
- 6-1-7 Partner Impact and Process Reengineering Reports

WHAT CHAPTER 6 IS ABOUT

Now that you understand the foundations of modeling with BPR software as explained in Chapter 5, this chapter delves into the analysis and redesign phase. Through the use of an example, the chapter works through the analysis and redesign steps and shows how a partner impact analysis report can be generated. The example is in the context of redesigning enterprise processes around the business-to-consumer interface and dealing with enterprise integration issues of linking the front office and back office.

0 ANALYSIS AND REDESIGN ACTIVITIES

The analysis and redesign activities in phase 2 of process redesign are shown in both Figure 6-1 and Table 6-1. They are inextricably interwoven with modeling activities in an iterative and interactive sequence that is difficult to depict in a linear sequence. Thus

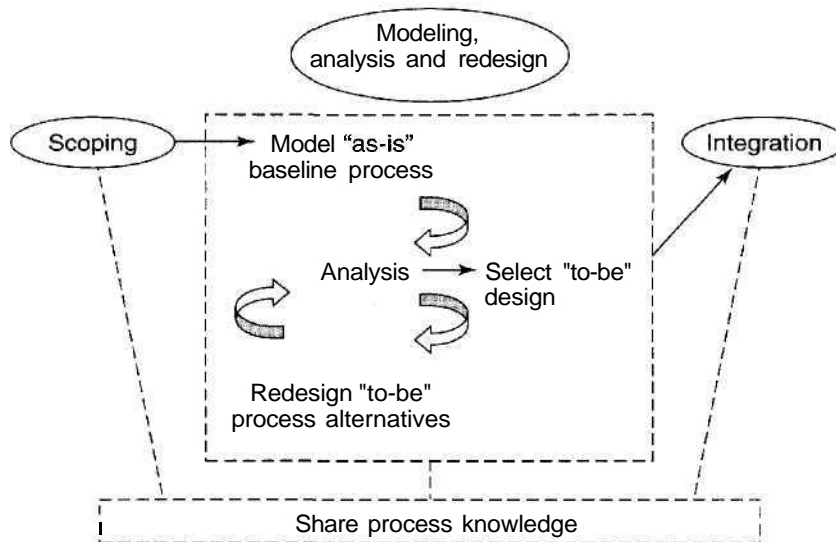


FIGURE 6-1 Phases of business process redesign with BPR software

depending on the nature of the business process redesign engagement, the context, and the purpose of the redesign, the sequence will vary.

The chapter illustrates analysis and redesign steps through an example in the context of redesigning enterprise processes around the business-to-consumer interface and deals with the enterprise integration issues of linking the front office and back office. This example has both the customer focus and the enterprise integration focus that is typical of business-to-consumer e-business.

6-1 REDESIGNING THE CUSTOMER SERVICE PROCESS AT ZYCO INSURANCE

For purposes of exposition of analysis and redesign steps (phase 2), the context detail and details of the scoping phase (phase 1) in this example are kept to a minimum so as not to burden the reader. There are no details of data collection or the redesign participants. The objective is to illustrate analysis and redesign techniques through an example rather than present a fully detailed case.¹

6-1-1 Skeletal Storyline and Process Scoping

Zyco Auto Insurance is in the personal auto insurance business. Zyco wants to redesign its customer service processes so that they can be executed faster, more conveniently,

¹ The Zyco Insurance example is adapted from field work and modeling by Les Sunohara of Holosofx. His contribution is gratefully acknowledged.

TABLE 6-1 KEY PHASES AND ACTIVITIES IN BUSINESS PROCESS REDESIGN WITH BPR SOFTWARE

Phase 1 Scoping the process	Phase 2 Modeling, analysis, and redesign of process	Phase 3 Planning process integration
Activities		
<ul style="list-style-type: none"> Operationalize process performance targets Define process boundaries Identify key process issues Understand best practices and define initial visions Outline data collection plan and collect baseline data Plan for modeling phase 	<ul style="list-style-type: none"> Continue data collection Model "As-Is" baseline process Analyze and diagnose "As-Is" process Design and model "To-Be" process alternatives Analyze "To-Be" process alternatives and select best alternative Plan process integration phase 	<ul style="list-style-type: none"> Provide workflow model or requirements for IS design Adjust process design Plan for process implementation
Deliverables		
<ul style="list-style-type: none"> Process Scoping Report 	<ul style="list-style-type: none"> Software-Based Process Model Partner Impact Report Process Reengineering Report 	<ul style="list-style-type: none"> Process Integration Plan
Key Participants		
<ul style="list-style-type: none"> Process Owners and Partners Customers of Process BPR Team 	<ul style="list-style-type: none"> Process Participants BPR Team 	<ul style="list-style-type: none"> IS Design Team BPR Team

and more efficiently. They want to improve the customer experience as well as bring benefits to both customers and partners. They also want to streamline their customer service processes so that they can start to move in the direction of e-business and capitalize on the opportunities that e-business offers.

Customer service processes include claims processes, insurance policy change processes, insurance policy renewal processes, and insurance policy cancellation/reinstatement processes. While Zyco is rethinking all of these processes and how they are related, the focus in this example is the claims process. Specifically, we will examine the auto windshield repair claim process. What happens when an insured customer has his car's windshield broken and needs to get it repaired and paid for by his auto insurance policy?

The auto windshield claims process can be viewed as including three subprocesses: checking insurance coverage to see if the customer is insured; repairing the windshield; and processing the insurance claim and settling payment. Apart from Zyco and the insured customer, the other partners in the process include independent insurance agents who sell Zyco auto insurance policies and glass repair shops that repair windshields.

There are several inefficiencies and customer service problems in the current auto windshield repair claims process at Zyco Insurance. When an insured customer needs to have his windshield repaired, the insured usually calls his independent insurance agent or *Zyco* to inquire where to take his vehicle to have the repairs conducted. In many cases, the insured encounters delays in reaching the agent or *Zyco* due to the backlog of phone calls at these locations. When the insured does get through, the agent or *Zyco* checks that his claim is valid, at which point the insured is directed to take his vehicle to a choice of repair shops.

The current process has some unwanted fraud exposure. If the insured is told by *Zyco* that he does not have windshield coverage, there is nothing to stop him from phoning his agent and requesting to have the coverage added to his policy and then claiming for the windshield later.

Once the insured is at the glass repair shop, the repair shop has to call either the agent or *Zyco* to confirm the insurance coverage and applicable payment deductible. The repair shop then encounters the same telephone tag problems in phoning the agent or *Zyco*. In some cases, the repair shop may not be able to get through to the agent or *Zyco* until after hours or a weekend, and so the shop may proceed with the repairs without authorization. In these instances, the repair shop assumes the risk if the insured does not have the proper insurance coverage and/or payment deductibles. If this occurs, the repair shop often spends much effort getting the customer to pay the money he owes. The repair shop usually takes the financial risks instead of losing the customer to a competitor.

If the insurance coverage and deductible are confirmed, the insured customer pays the glass repair shop the deductible and the repair shop forwards the invoice (usually in hard copy format) to the regional/corporate office. The regional/corporate office will then invoice (usually in hard copy format) *Zyco* for the repairs. Upon receipt of the paper invoice, *Zyco* begins processing the claim. The invoice is scrutinized to ensure that appropriate pricing and discounts have been applied. If not, the invoice will be amended to reflect these changes. If the claim is not valid (no coverage), the invoice will be sent back to the glass repair shop indicating the reason for denial. If the claim is valid, the invoice information will be entered into *Zyco's* claim processing computer application system and the claim will be processed. The payment is made either in a bulk check or individual check depending upon the payment agreement. The payment is mailed, and claim notices are generated and mailed to the agent. Upon receipt of the claim notice, the agent will update his or her computer system with the claim information.

Some of the abbreviated results of the process scoping are shown in the process redesign targets form (Figure 6-2) and in the process boundaries form (Figure 6-3). For brevity, there is no exposition of the process SWOT analysis, customer/partner surveys, or work environment assessment. (As there was for the Paloma Bank case in Chapter 4.)

Process Redesign Targets



Process name: Auto Windshield Claims Process

<i>Process redesign goals</i>	<i>Priority</i>
1. Enhance customer service	High
2. Achieve more efficient claims processing for all partners	High
3. Reduce financial/fraud exposure for all partners	High



<i>Process performance targets</i>	<i>Measures</i>
1. Reduce cycle time for customer	<ul style="list-style-type: none"> • Average cycle time • Minimum and maximum cycle time • Cost reduction due to decrease in cycle time
2. Reduce costs through reduced fraud exposure	<ul style="list-style-type: none"> • Percentage of fraud detection • Cost reduction due to fraud reduction
3. Reduce costs for partners: agents and glass shops	<ul style="list-style-type: none"> • Time/cost savings with new process for agents and glass shops



<i>Binding management decisions</i>
1. Maintain industry standards for fraud exposure and financial exposure
2. Use IT to reduce time/cost and fraud
3. Must be able to handle crisis (e.g., increase of calls by double)

FIGURE 6-2 Process redesign targets for windshield repair claim process

6-1-2 Modeling the As-Is Baseline Process

The skeletal as-is process is modeled using the Workflow.BPR software. The software model contains the essential information (times, costs, resources) needed to illustrate process analysis techniques. Please note that in practice (as mentioned in Chapter 5) the modeling is more detailed and iterative and there needs to be engagement with everyone involved.

Process Boundaries



Process name: Auto Windshield Claims Process

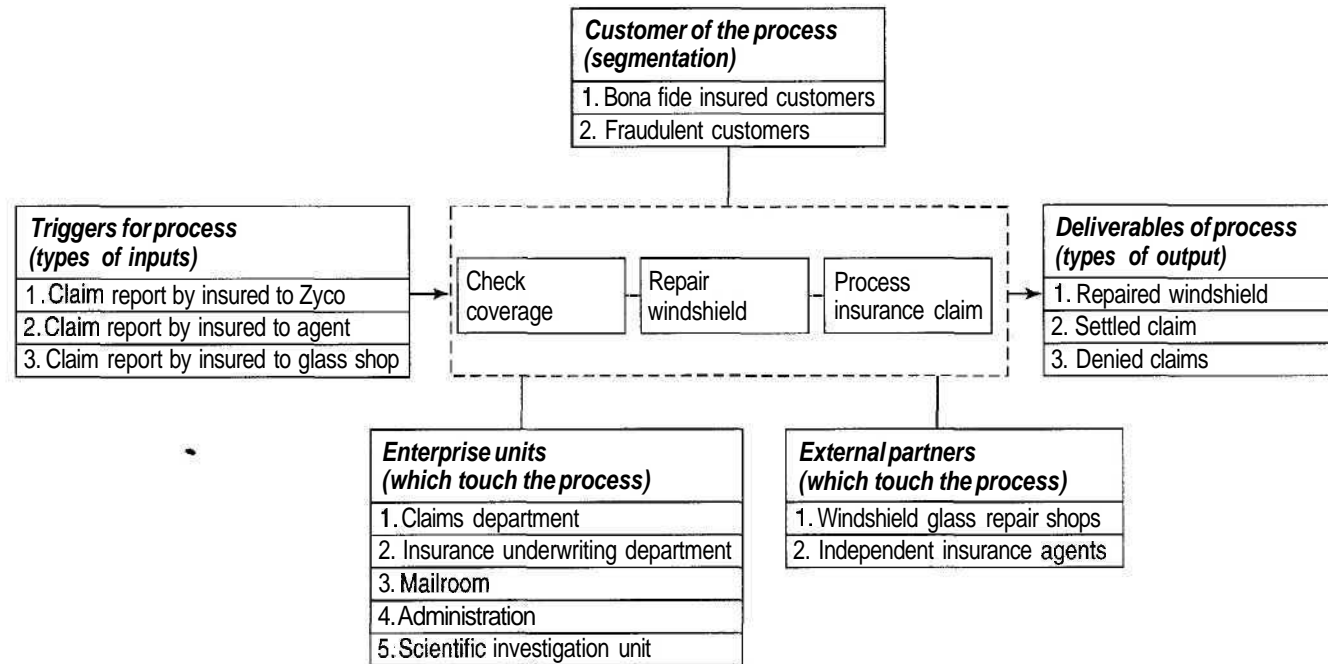


FIGURE 6-3 Process boundaries for windshield repair claim process

The software model can be accessed through the book's CD-ROM and is titled Zyco.org. After you install the software successfully, you can find the As-Is.org file in the Zyco directory under the Samples directory. For purposes of illustration, the model is kept simple. Typically in practice, there might be several process layers and levels. Browse through the as-is process through the software and read the annotations to understand and get a feel for how the process works. There are 15 cases that can be generated based on different paths. The Activity Decision Flow diagram for the as-is process is shown in Figure 6-4.

In Figure 6-4, problems, possible improvements, and explanations are attached to the process map using the Workflow.BPR's annotation feature.

6-1-3 Analysis and Diagnosis of As-Is Baseline Process

Analysis of the as-is process helps us understand how well the process works and where performance bottlenecks are. It also helps us diagnose process problems and identify critical areas where the most redesign is needed. Furthermore, an analysis of the performance of the as-is baseline process is used later when redesigning the process in order to compare alternative to-be designs with the as-is process as well as to know the extent of process improvement.

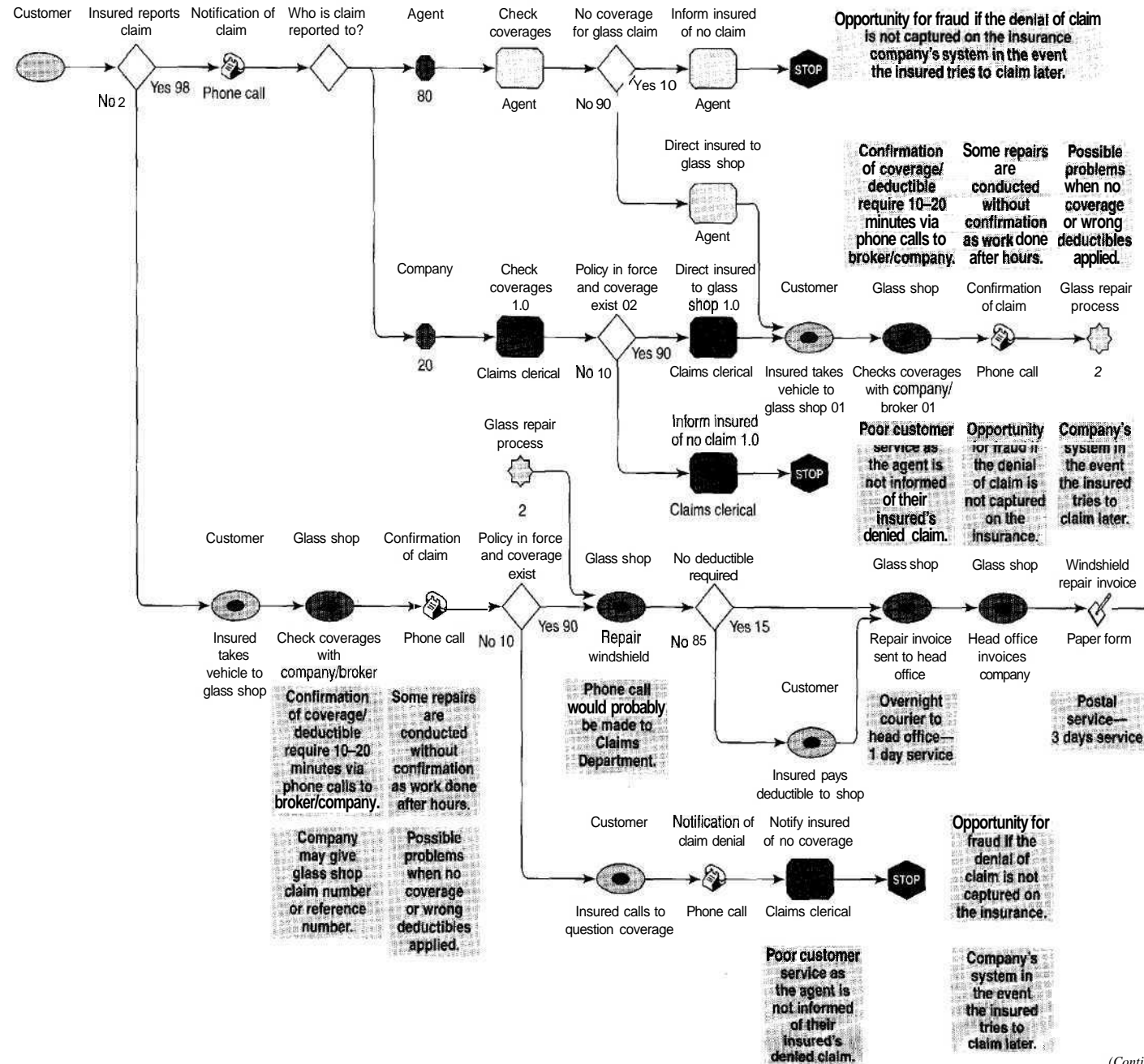
Identifying Process Problems Through Modeling Many of the process problem symptoms are identified as data is being collected and interpreted to model the process and its cases. Through the Annotation object in the software, these problems can be documented as part of the model. Examples are annotated in the Activity Decision Flow diagram. These symptoms indicate problems in information flow, accessing information directly, sharing information across partners, and coordination. Tracing these symptoms to their root causes suggests that the paper-based flow is causing many of the problems as is the lack of easy sharing of information among process partners (insurance companies, windshield repair shops, and agents). It is also apparent that Zyco does not have adequate enterprise integration infrastructure and that its back-office processes and front-office customer interface are not well connected.

Process Analysis Through Cases Analysis of the as-is baseline process is done by calculating and exploring process performance while taking into account the multiple paths (Cases) that constitute the process. As shown in Chapter 5, the combination of decisions and choices in a process model creates a set of unique paths through the process. Each individual path is called a Case.

Cases can differ substantially in how they impact the overall time and cost of a process as well as the resources needed to perform the process. Each Case has a probability of occurrence that determines how much impact the Case will have on the overall process. One high-cost exception Case can add much cost and time to a process if its probability of occurrence is high enough. It is not uncommon in many business processes that a "killer exception" Case that occurs 5 percent of the time that the process is executed may take 10 times as long to execute and cost five times as much as the other Cases. These are the Cases that an as-is process analysis can help find.

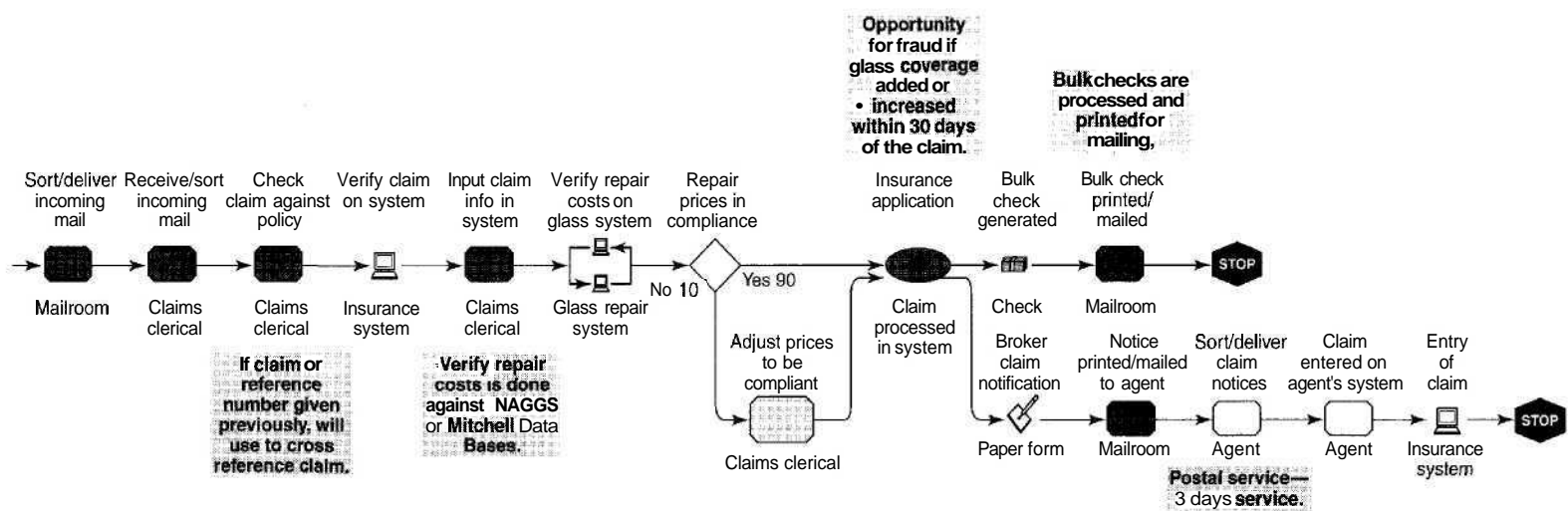
FIGURE 6-4 Auto windshield repair claim "as-is" process

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(Continued)

FIGURE 6-4 Auto windshield repair claim "as-is" process (Continued)



You can review the Cases through the Expanded Process Cases window. The expanded view of the process brings all objects in any sub-processes to the same level (does not apply for this example) and displays an expanded version of the process. To view the Cases, click on the Cases tool button. There are 15 possible Cases in the as-is windshield claims process based on the various decisions and choices.

Individual Case Analysis You can isolate a Case and analyze it individually. It could be the most frequently occurring one, the one that causes the most delay, the one that differs most in cost, or the one that customers complain about most. This allows you to more carefully diagnose the case and gives pointers for redesign.

Weighted Average Analysis A Case can be analyzed individually in detail, or the entire combination of Cases can be analyzed together and the results aggregated. Analyzing the entire combination of Cases can be done through weighted average analysis. A weighted average is created because the data from each Case are not treated equally based on their probability of occurrence. Thus Cases with a high probability of occurrence are given a greater weight in calculations than Cases with a low probability of occurrence. Thus each Case is weighted by its probability of occurrence when doing time and cost calculations. The time and cost of the individual Cases are multiplied by the percentage of the Case to give a weighted value for the time and cost. Then the weighted values of all the Cases are added up to give a weighted average for the time or cost of the whole process. For example, suppose we had only two Cases: Case 1 costs \$25 and occurs 40 percent of the time, and Case 2 costs \$10 and occurs the remaining 60 percent of the time. The weighted average cost is $0.4 \times \$25 + 0.6 \times 10 = \16 .

You can initiate weighted average calculations through the **Report Menu**. You can also view tables that present weighted averages for time and costs through the **Report Menu**. You can export the tables for costs and times to Excel spreadsheet templates through the Workflow.BPR software. The Process summary report shown in Table 6-2 can be generated through the **Report Menu** (select **Analysis Reports** and then **Export**).

For simplicity, there is limited resource cost information in the model. This includes salaries for employees (for example, \$25K per year for agent, \$15K per year for mail clerk at Zyco, \$20K per year for claims clerk at Zyco, and \$20K per year for glass repair person).

Table 6-2 is a summary of case analysis for the as-is process. Three reports from the Workflow.BPR—**Cases Cycle Time, Cases Process Times, and Cases Total Costs**—were used to create Table 6-2. The case analysis for the as-is process shows the following:

- *Claims processed:* The analysis shows that 90 percent of all claims received are processed. The cost of processing a claim ranges from \$1.64 to \$4.13 and averages \$3.48. The cycle time from the time the claim is reported until the process is completed averages 11.39 days. The processing time inside Zyco averages 7.66 days. The working

time in the process during which the claim is being worked on averages 19 minutes (.04 days x 8 hours x 60).

- *Mostfrequently occurring Cases:* Case 1 in which the insured reports the claim to an agent and all is normal occurs 54 percent of the time. However, that Case costs \$3.65 per claim—twice as much as the least-cost Cases (Cases 9 and 12 at \$1.64).

- *Least-cost Case:* Having identified Cases 9 and 12 as the least-cost Cases (\$1.64) we can examine each of these Cases individually through the Process Cases window. Cases 9 and 12 are the ones where the insured goes directly to the windshield glass repair shop without notifying the agent or Zyco of the claim and confirming coverages. The onus falls on the glass repair shop to call the agent or Zyco. In case the glass repair shop cannot get through, it can expose itself financially by repairing the windshield and either charging the incorrect deductible or repairing a vehicle that does not have glass

TABLE 6-2 COMPARISON OF AUTO WINDSHIELD CLAIM REPAIR PROCESS TO AUTO WINDSHIELD CLAIMS DENIED ("AS-IS" PROCESS)*

Auto Windshield Claims Processed

Process case name	Percent	Process time	External time	Transfer time	Wait time	Working time	Cycle time	Resource cost
Case 1	53.98%	7.66d	0.49d	7.00d	0.12d	0.04d	11.39d	\$3.65
Case 2	13.49%	7.65d	0.49d	7.00d	0.12d	0.04d	11.39d	\$2.76
Case 3	9.53%	7.65d	0.49d	7.00d	0.12d	0.04d	11.39d	\$3.65
Case 5	6.00%	7.66d	0.49d	7.00d	0.12d	0.05d	11.39d	\$4.13
Case 6	2.38%	7.65d	0.49d	7.00d	0.12d	0.04d	11.39d	\$2.76
Case 8	1.50%	7.66d	0.49d	7.00d	0.12d	0.04d	11.39d	\$3.25
Case 9	1.38%	7.64d	0.49d	7.00d	0.12d	0.02d	11.39d	\$1.64
Case 10	1.06%	7.66d	0.49d	7.00d	0.12d	0.05d	11.39d	\$4.13
Case 11	0.26%	7.65d	0.49d	7.00d	0.12d	0.04d	11.39d	\$3.25
Case 12	0.24%	7.63d	0.49d	7.00d	0.12d	0.02d	11.39d	\$1.64
Case 14	0.15%	7.64d	0.49d	7.00d	0.12d	0.03d	11.39d	\$2.12
Case 15	0.03%	7.64d	0.49d	7.00d	0.12d	0.03d	11.39d	\$2.12
Weighted Average	90.00%	7.66d	0.49d	7.00d	0.12d	0.04d	11.39d	\$3.48

Auto Windshield Claims Denied Due to No Glass Coverage

Process case name	Percent	Process time	External time	Transfer time	Wait time	Working time	Cycle time	Resource cost
Case 4	7.84%	0.03d	0.00d	0.00d	0.00d	0.03d	0.39d	\$3.00
Case 7	1.96%	0.03d	0.00d	0.00d	0.00d	0.03d	0.39d	\$2.40
Case 13	0.20%	0.13d	0.11d	0.00d	0.00d	0.01 d	0.42d	\$0.80
Weighted Average	10.00%	0.03d	0.00d	0.00d	0.00d	0.03d	0.39d	\$2.84

*Actual numbers may vary slightly depending on simulation set-up.

coverage. Thus while this Case may be the least cost for Zyco, it is not for its partner in the process.

- *Claims denied:* Cases 4, 7, and 13 are the cases in which auto windshield repair claims received are denied due to the insured customers not having windshield glass coverage in their auto insurance policies. The analysis shows that this is 10 percent of all claims received. These denials cost \$2.84 per claim on average and require approximately 15 minutes (0.03 days x 8 hours = 0.24 hours) to process.

We have now analyzed the process and understood how its Cases behave. We have also identified some problems with the process. We are now in a much better position to start redesigning it and determining what the to-be design should be like.

6-1-4 Analysis and Redesign of the To-Be Process

Drawing on Redesign Principles to Model the To-Be Process The redesign principles and tactics presented in Chapter 3 can be used as a checklist to suggest ways of redesigning the process. Table 6-3 provides a summary of their essence to be used as a checklist. More details about tactics can be found in Chapter 3.

TABLE 6-3 PROCESS REDESIGN PRINCIPLES

Process redesign principle	Essence
Restructuring and reconfiguring process	
#1 Lose Wait	Squeeze out waiting time in process links.
#2 Orchestrate	Let swiftest and ablest enterprise execute.
#3 Mass-Customize	Flex process for any time, place, or way.
#4 Synchronize	Synchronize physical and virtual parts of process.
Changing information flows around process	
#5 Digitize and Propagate	Capture information digitally at the source and propagate it.
#6 Vitrify	Provide in-process visibility with fresher and richer information.
#7 Sensitize	Fit with vigilant sensors and feedback loops to prompt action.
Changing knowledge management around the process	
#8 Analyze and Synthesize	Augment interactive analysis and synthesis.
#9 Collect, Connect, Create	Grow knowledge around process through all who touch it.
#10 Personalize	Make process intimate with preferences/habits of participants.

For this round of process redesign for the auto windshield repair claims process, the principles that are most applicable appear to be the ones related to restructuring and re-configuring processes and those related to changing information flows around the process.

Tactics from principles #1 through #7 were used to trigger ideas while also drawing ideas from best practices in exemplar companies in the area of customer service across multiple partners. In order to clarify the problems of the as-is process and identify needed changes, making a problem-solution table as shown in Table 6-4 may be helpful.

TABLE 6-4 PROBLEM-SOLUTION TABLE

Problems	Possible solutions
Claims are not processed during off-work hours and it takes a long time just to verify insurance coverage.	Create a 24 X 7 call center. Create a webpage that verifies insurance coverage.
Glass shops have to call company to verify customer's coverage even if the customer already verified it with Zyco or agent.	Assign a unique tracking number when a claim is verified.
Current process does not detect frauds.	Record all coverage inquiries to detect potential frauds.
Exchanging documents with agents and glass shops takes a long time.	Consider electronic medium to exchange documents (EDI or Web application). Create shared customer database for real-time access.

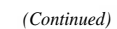
In combination, this resulted in the following redesign initiatives for the process:

- *Windshield Glass Repair Call Center:* Establishing a windshield glass repair Call Center with extended hours that a customer can contact through a toll-free telephone number. The Call Center would immediately give an insured customer telephone authorization through their electronic database access using a "work control number." This work control number would serve as a tracking mechanism for Zyco and the glass shop. The Call Center would also have a list of preferred windshield repair shops. The insured could go to any of these glass repair shops directly without having to call either Zyco or the insurance agent. When the customer arrived at the repair shop, he or she would only need to give the work control number and the repair shop would be able to access the authorization and deductible from a shared electronic database.

Glass repair shops could also contact the Call Center for walk-in customers. This allows more efficient customer service and minimizes financial and fraud exposure for the glass repair shops.

- *Zyco Web site:* Creating a Web site for customers would provide browser access through the Web as an additional access route for customers to locate how to handle a needed windshield repair and how to find a windshield repair shop as well as having access to verify coverages and deductibles.

150




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graph LR
    Start(( )) --> Poll[Poll and process]
    Poll --> Trigger{If claim triggers the fraud indicators, is passed to an investigation unit}
    Trigger -- No 1 --> NoFraud{No trigger for fraud}
    Trigger -- Yes 99 --> Investigate[Investigate possible fraud]
    NoFraud -- No 1 --> NoFraud
    NoFraud -- Yes 99 --> NoFraud
    Investigate -- No 1 --> NoFraud
    Investigate -- Yes 99 --> NoFraud
    NoFraud -- No 10 --> Repair{Repair prices in compliance}
    NoFraud -- Yes 90 --> Repair
    Repair -- No 10 --> Adjust[Adjust prices to be]
    Repair -- Yes 90 --> Correct[Correct pricing]
    Adjust --> Claims[Claims clerical]
    Correct --> EDI1[EDI]
    Claims --> EDI1
    EDI1 --> ClaimProcessed{Claim processed by}
    ClaimProcessed --> BulkCheck[Bulk check payment]
    ClaimProcessed --> AgentNotified[Agent notified of glass]
    BulkCheck --> EDI2[EDI]
    AgentNotified --> EDI2
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    Stop97 --> Stop98((STOP))
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    Stop99 --> Stop100((STOP))
    
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The flowchart illustrates the insurance claims process, starting with an "Insurance application" and "Poll and process". A decision point "If claim triggers the fraud indicators, is passed to an investigation unit" leads to "No trigger for fraud" (No 1) or "Investigate possible fraud" (Yes 99). The "Investigate possible fraud" step leads to "Fraud investigator" and then to "No fraud identified" (No 1) or "Repair prices in compliance" (Yes 99). The "No fraud identified" step leads to "No trigger for fraud" (No 1) or "Persue fraud investigation" (Yes 99). The "Repair prices in compliance" step leads to "Adjust prices to be" (No 10) or "Correct pricing" (Yes 90). The "Adjust prices to be" step leads to "Claims clerical" and then to "Correct pricing" (EDI). The "Correct pricing" step leads to "Claim processed by" and then to "Bulk check payment" (EDI) and "Agent claim notification" (EDI). The "Bulk check payment" step leads to "Agent notified of glass" and then to "Agent" (STOP). The "Agent claim notification" step leads to "Agent notified of glass" and then to "Agent" (STOP). The "Agent notified of glass" step leads to "Agent" (STOP). The "Agent" step leads to "STOP".

Text boxes:

- Top Left:** If claim triggers the fraud indicators, is passed to an investigation unit.
- Top Right:** Bulk checks are processed and sent via EFT.
- Bottom Left:** The email is noted on the policy in case the insured attempts to claim later.
- Bottom Left (continued):** The notification could be done by email depending on the client's reaction.
- Bottom Right:** Claim notice generated for agent.
- Bottom Right (continued):** Notification either on a daily, weekly, or monthly basis based on broker request.

- *Shared electronic database access between partners:* Creating shared access for a windshield coverage electronic database among Zyco, insurance agents, and the preferred glass repair shop. The integrity and security of each party's data would be protected through passwords. For example, the glass repair shop would enter the insured's policy number, expiration date, and year, make, and model of the vehicle. If there was a hit, the program would send back a message "coverage in effect" and the deductible amount. If there was no hit, a message would be sent back "no coverage, call agent for more information."

- *EDI for electronic forms transfer between partners:* Establishing an EDI link through Internet access that allows Zyco departments, agents, and glass shops to exchange claim forms, invoices, and other structured documents electronically from one computer to another. EDI (Electronic Document Interchange) is a standard way of exchanging structured documents from one computer to another so that transactions can be directly processed through those documents. For example, windshield repair shops could send the claim repair invoice through EDI to Zyco where it would be processed automatically, if validated by Zyco's claims processing application, and payment issued. This would eliminate many of the delays and errors due to hard copy forms where data has to be reentered several times as it moves from one partner to another.

- *Creation of electronic audit file:* All inquiries using the Web site or shared electronic database are captured in an audit file. This audit file would be used to compare the total number of inquiries by glass shop to the total number of claims processed in order to check unusual activity and fraud. For example, the dates of inquiries from glass repair shops for customers who do not have windshield coverage would be tagged to the customer record in case they tried to add windshield coverage later.

The to-be process is modeled with the software. The Activity Decision Flow diagram for the redesigned to-be process is printed in Figure 6-5. You can find the To-Be.org file in the Zyco directory under the Samples directory. For simplicity, we only have one design for the process. It is not uncommon to have more than one alternative (say two alternative designs) and then to select one of them based on analysis and implementation to fit the enterprise.

Analysis of the To-Be Process There are now 35 Cases in the redesigned process. Case analysis for the to-be process shows the following (See Table 6-5):

- *Claims processed:* The analysis shows that 89 percent of all claims received are processed, which is not significantly different from the as-is process. The cost of processing a claim now averages \$0.62, significantly lower than \$3.48 in the As-Is process. There are, however, some exceptions that occur very infrequently (less than .01 percent) that can cost as much as \$73.52 per claim. (This cost may seem high but these are the minority of cases where the Fraud Investigator is investigating potential fraudulent activities. Although the cost is high per claim, the successful investigation to deny a claim could save Zyco \$500-\$1000 in repair costs for a windshield.) The cycle time from the time the claim is reported until the process is completed averages 1.45 days. This is a big improvement from what used to be 11.45 days. The processing time inside Zyco averages 0.5 days. The working time in the process during which the claim is being worked on now averages about 2 minutes.

TABLE 6-5 COMPARISON OF AUTO WINDSHIELD CLAIM REPAIR PROCESS TO AUTO WINDSHIELD CLAIMS DENIED ("TO-BE" PROCESS)*

Auto Windshield Claims Processed								
Process case name	Percent	Process time	External time	Transfer time	Wait time	Working time	Cycle time	Resource cost
Case 1	61.35%	0.45d	0.45d	0.00d	0.00d	0.00d	1.35d	\$0.20
Case 2	10.83%	0.45d	0.45d	0.00d	0.00d	0.00d	1.35d	\$0.20
Case 4	6.82%	0.46d	0.45d	0.00d	0.00d	0.01d	1.35d	\$0.68
Case 5	4.91%	0.47d	0.45d	0.00d	0.00d	0.01d	2.35d	\$1.60
Case 6	1.23%	0.47d	0.45d	0.00d	0.00d	0.01d	2.35d	\$1.32
Case 7	1.20%	0.45d	0.45d	0.00d	0.00d	0.01d	1.35d	\$0.68
Case 8	0.87%	0.46d	0.45d	0.00d	0.00d	0.01d	2.35d	\$1.60
Case 11	0.61%	0.95d	0.45d	0.00d	0.38d	0.13d	2.35d	\$24.24
Case 12	0.55%	0.47d	0.45d	0.00d	0.00d	0.02d	2.35d	\$2.08
Case 13	0.22%	0.46d	0.45d	0.00d	0.00d	0.01d	2.35d	\$1.32
Case 16	0.14%	0.47d	0.45d	0.00d	0.00d	0.02d	2.35d	\$1.80
Case 17	0.11%	0.95d	0.45d	0.00d	0.38d	0.13d	2.35d	\$24.24
Case 18	0.10%	0.47d	0.45d	0.00d	0.00d	0.02d	2.35d	\$2.08
Case 19	0.07%	0.96d	0.45d	0.00d	0.38d	0.13d	2.35d	\$24.72
Case 20	0.05%	0.97d	0.45d	0.00d	0.38d	0.14d	3.35d	\$25.64
Case 21	0.02%	0.47d	0.45d	0.00d	0.00d	0.02d	2.35d	\$1.80
Case 22	0.01%	0.97d	0.45d	0.00d	0.38d	0.14d	3.35d	\$25.36
Case 23	0.01%	0.95d	0.45d	0.00d	0.38d	0.13d	2.35d	\$24.72
Case 24	0.01%	0.96d	0.45d	0.00d	0.38d	0.14d	3.35d	\$25.64
Case 25	0.01%	2.95d	0.45d	0.00d	2.13d	0.38d	3.52d	\$72.12
Case 26	0.01%	0.97d	0.45d	0.00d	0.38d	0.15d	3.35d	\$26.12
Case 27	0.00%	0.96d	0.45d	0.00d	0.38d	0.14d	3.35d	\$25.36
Case 28	0.00%	0.97d	0.45d	0.00d	0.38d	0.15d	3.35d	\$25.84
Case 29	0.00%	2.95d	0.45d	0.00d	2.13d	0.38d	3.52d	\$72.12
Case 30	0.00%	0.97d	0.45d	0.00d	0.38d	0.15d	3.35d	\$26.12
Case 31	0.00%	2.96d	0.45d	0.00d	2.13d	0.39d	4.52d	\$73.52
Case 32	0.00%	0.97d	0.45d	0.00d	0.38d	0.15d	3.35d	\$25.84
Case 33	0.00%	2.96d	0.45d	0.00d	2.13d	0.39d	4.52d	\$73.24
Case 34	0.00%	2.96d	0.45d	0.00d	2.13d	0.39d	4.52d	\$73.52
Case 35	0.00%	2.96d	0.45d	0.00d	2.13d	0.39d	4.52d	\$73.24
Weighted Average	89.10%	0.46d	0.45d	0.00d	0.00d	0.00d	1.45d	\$0.62
Claims Denied Due to No Glass Coverage								
Process case name	Percent	Process time	External time	Transfer time	Wait time	Working time	Cycle time	Resource cost
Case 3	9.00%	0.11d	0.09d	0.00d	0.00d	0.03d	1.35d	\$1.92
Case 9	0.80%	0.04d	0.00d	0.00d	0.00d	0.04d	1.35d	\$3.61
Case 10	0.72%	0.13d	0.09d	0.00d	0.00d	0.04d	2.35d	\$3.33
Case 14	0.20%	0.05d	0.00d	0.00d	0.00d	0.05d	1.35d	\$3.53
Case 15	0.18%	0.13d	0.09d	0.00d	0.00d	0.04d	2.35d	\$3.04
Weighted Average	10.90%	0.11d	0.08d	0.00d	0.00d	0.03d	1.43d	\$2.19

*Actual numbers may vary slightly depending on simulation set-up.

- *Most frequently occurring and least-cost Cases:* Cases 1 and 2 in which the insured reports the claim to the glass repair Call Center occur about 70 percent of the time. These two Cases costs \$0.20 per claim, and are also the least expensive Cases. This is a big improvement.

- *Claims denied:* Cases 3, 9, 10, 14, and 15 are the cases in which auto windshield repair claims received are denied due to the insured customers not having windshield glass coverage in their auto insurance policies. The analysis shows that this is about 11 percent of all claims received. These denials cost \$2.19 per claim on the average and require approximately 0.03 days (15 minutes) to process. This is the same as the as-is case.

-5 Comparing As-Is and To-Be Processes

The Process Comparison report (tables below) gives a comparison related to costs and times. They are self-explanatory. These tables can be generated through **Report-Analysis Reports . . . Process Comparison** in the Workflow.BPR menu. Table 6-6 shows examples of the reports generated by the software.

TABLE 6-6 COMPARISONS OF AS-IS AND TO-BE

Cycle Time				
Type of cycle time	As-is	To-be	Difference	% Change
Cycle Time (Hours)	226.45	34.33	192.12	84.84%
Minimum Cycle Time (Hours)	226.45	53.14	173.31	76.53%
Process Times				
Type of process time	As-is	To-be	Difference	% Change
Process time (hours)	55.15	3.35	51.80	93.93%
External time (hours)	3.53	3.28	0.25	7.08%
Transfer time (hours)	50.40	0.00	50.40	100.00%
Wait time (hours)	0.90	0.03	0.87	96.67%
Working time (hours)	0.33	0.05	0.28	84.85%
Resource Costs				
Type of resource	As-is	To-be	Difference	% Change
Agent	\$2.37	\$0.31	\$2.06	86.92%
Claims clerical	\$1.05	\$0.26	\$0.79	75.24%
Claims processing	\$0.00	\$0.00	\$0.00	0.00%
Fraud investigator	\$0.00	\$0.22	(\$0.22)	0.00%
Glass shop	\$0.00	\$0.00	\$0.00	0.00%
Insured	\$0.00	\$0.00	\$0.00	0.00%
Mailing	\$0.00	\$0.00	\$0.00	0.00%
Mailroom	\$0.00	\$0.00	\$0.00	0.00%
Total Costs	\$3.42	\$0.79	2.63	76.90%

Continued on next page

TABLE 6-6 COMPARISONS OF AS-IS AND TO-BE (Continued)

Resource Times				
Type of resource	As-Is	To-Be	Difference	% Change
Agent	0.20	0.03	0.17	85.00%
Claims clerical	0.11	0.03	0.08	72.73%
Claims processing	0.00	0.00	0.00	0.00%
Fraud investigator	0.00	0.01	-0.01	0.00%
Glass Shop	0.00	0.00	0.00	0.00%
Insured	0.00	0.00	0.00	0.00%
Mailing	0.00	0.00	0.00	0.00%
Mailroom	0.03	0.00	0.03	100.00%
Total Time (Hours)	0.34	0.07	0.27	79.41%

6-1-6 Analysis of What-If Scenarios Through Simulation

Process simulation means to mimic the behavior of the process on a blow-by-blow basis through a software model. This is done by executing the process repetitively in the software through "jobs." Each job is an instance of execution of the process in which events occur and resources are applied to process tasks. Through software simulation, we are able to observe in a few minutes the expected behavior of the process over long periods of time (for example, a month).

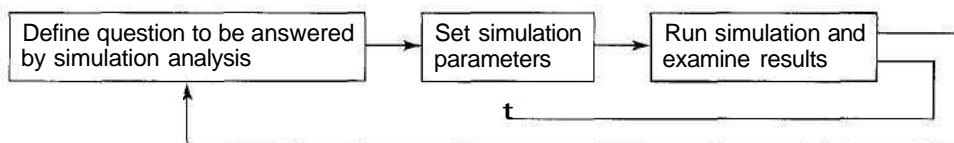
While weighted average analysis gives an aggregate long-term average view of the process performance, simulation provides an event-driven short-term dynamic view of the process that can be observed visually on the process map as it happens. Visual animation allows you to see the work context as if it were unraveling step by step; it is showing the flows moving and queues building up. Simulation analysis is useful for both diagnosing process problems and analyzing what-if scenarios as resource levels are changed in the process.

The sequence of steps to perform simulation analysis is shown in Figure 6-6. The first step is to decide which questions need to be asked and answered either for process capacity analysis or bottleneck analysis or unusual event analysis.

Step 1. Defining Questions for Simulation Analysis

The three most common questions for BPR simulations are as follows:

1. Do the as-is and to-be processes have enough capacity? How much is capacity improved in the to-be process?

FIGURE 6-6 Simulation analysis steps

2. What are the bottlenecks of the as-is and to-be processes? Where should resources be increased to improve the process?
3. What happens if an unusual extreme event occurs? How well can the as-is and to-be processes handle the event?

For the Zyco windshield repair claims process, the following questions can be asked:

- *Process capacity analysis:* What is the capacity of the process? Currently there are 1,000 claims per week that are processed through Zyco. What would happen to process performance and customer response time if Zyco doubled its customer base? What is the maximum number of jobs that can be completed per week given current resource levels? What would happen to the process performance if resources are decreased?
- *Bottleneck analysis:* Where are the bottlenecks in the process? What tasks in the process have the largest number of items waiting in the queue? Which spot in the process has the most congestion and delay? How does that change if upstream practices are changed or resources are increased?
- *Unusual event analysis:* What would happen to process performance if there was a short-term surge in windshield repair due to an earthquake or a big storm?

Step 2. Setting Up Simulation Parameters

Based on these questions, the second step of setting up simulation parameters can be done through the Simulation Setup dialog box.

Simulation Parameters

- *General conditions:* such as simulation start times, calendar choices, duration of the simulation, and whether inputs to the process (**Jobs**) can be created during non-working hours (for example, the process might be a 9 A.M. to 5 P.M. process or it can be triggered 24 hours a day through the Internet).
- *Number and rate of jobs:* that are generated in the simulation. The simulation ends when the number of **Jobs** specified has been processed or the maximum duration has been reached. The time intervals between **Jobs** can be set as variable when there is variability depending on hour of day (a hotel registration desk may have heavy customer traffic at checkout time in the morning), or on day of week (a doctor's office may have more walk-in patients the day after the weekend), or on month of year (a tax accounting office may have intensified customer inquiries the month before annual taxes have to be filed).
- *Resources requirements:* The attributes of **Resources** that are assigned to each Task can be modified. One of the key resource attributes is the number assigned to the Task (for example, how many people perform the task). Another resource attribute is the working duration of the **Task** and whether the time varies from **Job** to **Job** (for example, some are easy to process and some more difficult and thus take longer). The software allows the selection of a probability distribution and standard deviation for working durations to accommodate that variability. You can also specify the degree of concurrency for the Task in terms of how many **Jobs** can be performed simultaneously. Because the simulations track many **Jobs** at the same time, a single **Task** may have many jobs in its queue.

- **Resource allocation:** The allocation of resources to different organizational units can also be modified. The same resource (role) can be allocated to more than one organizational unit.

For the Zyco example, simulation analyses for two scenarios are examined:

- **Scenario 1 (Disaster Scenario):** There is a disaster (earthquake or storm) and 1,000 claims are reported in the first day. This scenario is to test whether the as-is and the to-be processes can handle an extraordinary situation and also to identify bottlenecks when the claims temporarily spike.

- **Scenario 2 (Growth Scenario):** The customers of Zyco increase so that the number doubles. As a result, there are 2,000 claims per week instead of the current 1,000 claims. This scenario is to check whether the as-is and the to-be processes can handle a doubled customer base with current resources and, if resources need to be added, where they should be added first.

Scenario 1 (Disaster Scenario) In this scenario a claim is reported every one second. This means that the 1,000 claims are reported in the first 20 minutes. Although this type of stress test does not depict reality, the statistics generated from the simulation provide valuable information that can assist in the decision-making process.

There are many possible simulation parameter settings for this scenario. In this example, four settings are selected as shown in Table 6–7. The first setting, "To Completion,"

TABLE 6–7 SIMULATION PARAMETERS FOR SCENARIO 1 (DISASTER SCENARIO)

Parameters	To completion	5 days	3 days	2 days
Random seed	0	0	0	0
Simulation start time	Default	Default	Default	Default
Disable max duration	X	Blank	Blank	Blank
Max duration	Blank	5 days	3 days	2 days
Calendar	24-hour calendar	24-hour calendar	24-hour calendar	24-hour calendar
Jobs during working hours only	✓	✓	✓	✓
Job details	✓	✓	✓	✓
Generator				
Total number of jobs to create	1,000	1,000	1,000	1,000
Time between jobs	1 second (exactly)	1 second (exactly)	1 second (exactly)	1 second (exactly)
Resource Allocation				
Agent	10	10	10	10
Claims clerical	3	3	3	3
Mail room	1	1	1	1

lets the simulation run until all 1,000 jobs are processed. The result of this setting will tell us when all the jobs are completed. The "5 Days" setting checks how many jobs are processed in the first week (5 working days). The third and fourth settings check how many claims are processed in the first 3 days and 2 days, respectively. The current number of agents, claims clerk, and mailroom personnel are 10, 3, and 1, respectively.

In order to open the Simulation Window, click the **Expanded Process** button (MI) in the Activity Decision Flow (ADF) diagram window and then click the **Simulation** button (). You first set up the initial conditions and parameters of your process simulation through the Simulation Setup dialog box. Click on the Simulation Dialog button () to open the Simulation Setup dialog box. You then run the simulation and examine the simulation results (with or without animation). You can then change resource allocations or other parameters and re-run to answer the what-if questions you want to answer. The **Analysis Guide** in the online help provides more detail about keystrokes and dialog boxes for process simulation analysis.

The way that the simulation works in the software is that it is triggered by the arrival of inputs to the process (Jobs), which are generated dynamically by the software. As a particular **Job** in the simulation progresses, **Phis** are transported from one activity to the next. **Tasks** are started when a **Phi** arrives and all the allocated **Resources** are available. Queues are built up as **Phis** arrive to **Tasks** that cannot begin because the **Resources** are not available (they may be engaged in another activity). When **Decisions** appear in the flow, a **Choice** is randomly selected based on the probabilities of all the **Choices** of that **Decision**, and the **Job** continues until there is a stop in the path that has been chosen. The results of the simulation change according to the number of **Jobs** or the selected time duration.

As **Phis** move through the **Process**, they are placed into In-Baskets, or **Task Queues**, when the **Resource** needed to act upon them is busy with another **Task** or **Job**. If the required **Resources** are not available, then the inputs of this **Task** will accumulate in the **Queues**. If there is nothing ahead of the **Job** in the **Queue** and the **Resources** that are assigned to the **Task** are available, the **Phis** are pulled out of the **Queue** and moved to the **Task** to be worked on. The **Resource** will choose the **Phi** that has been in the **Queue** the longest (First In, First Out). The software is also able to visually animate the events.

The simulation can be carried out with or without animation. With no animation, you do not visually see the progression of the process execution as **Jobs** are generated; it is done in the background. This is useful in saving time when simulating large models.

Scenario 2 (Growth Scenario) In this scenario, 2,000 claims are reported per week, but with a constant rate throughout the week. The time between jobs is 72 seconds [= (5 days a week x 8 hours a day x 3600 seconds an hour) / 2,000 jobs a week]. Table 6-8 shows three selected parameter settings that are similar to the ones selected for Scenario 1. The first setting examines how many of the 2,000 jobs are completed after a week (5 working days). The second and third settings check the number of jobs processed in the first 3 and 2 days, respectively.

TABLE 6-8 SIMULATION PARAMETERS FOR SCENARIO 2 (GROWTH SCENARIO)

Parameters	5 days	3 days	2 days
Random seed	0	0	0
Simulation start time	Default	Default	Default
Disable max duration	Blank	Blank	Blank
Max duration	5 days	3 days	2 days
Calendar	Standard calendar	Standard calendar	Standard calendar
Jobs during working hours only	✓	✓	✓
Job details	✓	✓	✓
Generator			
Total number of jobs to create	2000	2000	2000
Time between jobs	72 second (on average)	72 second (on average)	72 second (on average)
Resource Allocation			
Agent	10	10	10
Claims clerical	3	3	3
Mail room	1	1	1

Step 3. Running Simulation and Examining Results

The third step after setting the parameters is to run the simulation and examine simulation analysis results. If you have selected to have animation, you can visually see the flow of **Phis** as they move through the process. You can see the **Queues** build up as inputs enter the **In-Baskets** of **Tasks** (the number of queue items is given below the **In-Basket** as shown in Figure 6-7). You can also see when a **Resource** begins to work on a **Task** by watching the bitmaps that represent the resources descending down to the task. You see the change of status of a **Task** (waiting for a **Resource**, working, done) through its change of color. The number of inputs that the **Task** is handling simultaneously is shown in its upper left-hand corner.

In the as-is simulations, it is important to note that bottlenecks are not always seen in the Queues statistics. For example, in the 2-, 3-, and 5-day simulations, a cursory look at the Queues table would indicate that the bottlenecks are occurring at the "check coverage and direct insured to glass shop" tasks. By using the animation, however, you can see that all of these queues are emptied by the 2nd day and the vast majority of claims are held up between the glass shop head office and Zyco due to the transfer time of 3 days (mailing time). In looking at the simulation that runs the as-is model to completion, this becomes very apparent as the queues at Zyco run as high as 745 with an average queue as high as 322. This transfer time (3 days) both from the glass shop head office to Zyco and Zyco to the Agents are the main reasons for the cycle time being so high and delaying the processing of the windshield claims.

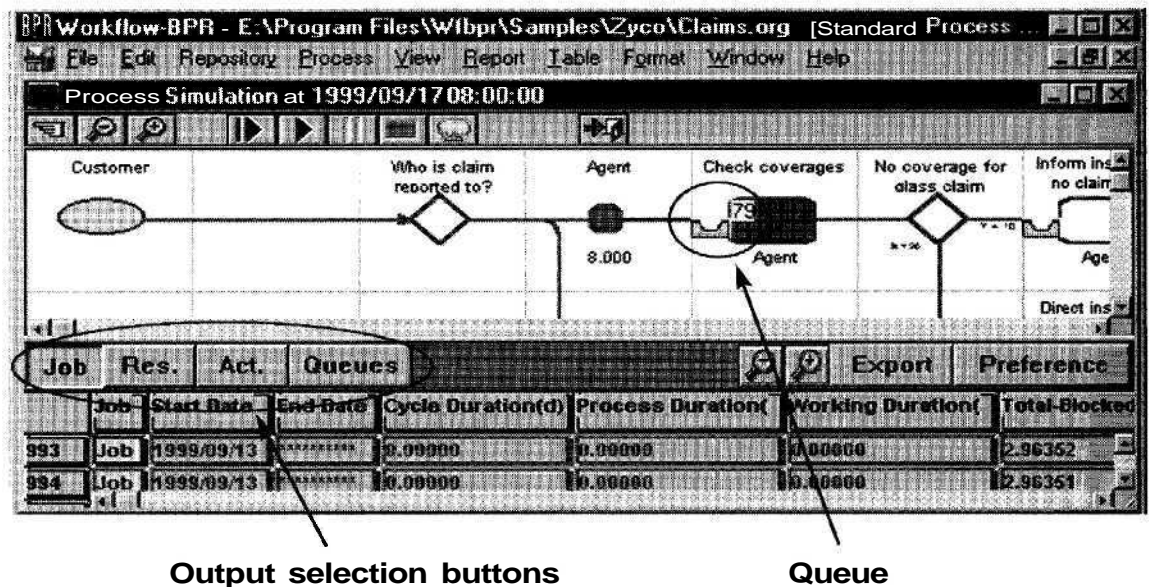


FIGURE 6-7 An example of simulation result

As a simulation is being run, data associated with the events of the simulation are collected. These results are displayed in the simulation tables in the bottom-half of the simulation window. Several different types of outputs can be displayed by clicking appropriate buttons, shown in Figure 6-7. These outputs are also exportable to standard spreadsheets for further calculations if necessary. Please note that the data reflect only the events that actually occurred during the simulation and do not necessarily reflect all possible situations that can occur in the execution of the process. Using another random number seed and repeating the simulation is one way of checking the robustness of the results.

Simulation Output Tables

- **Jobs Table:** This table shows for each **Job** the various time durations such as time spent working on **Tasks**, time spent waiting for **Tasks** to start, time spent waiting for blocked resources, and time spent in processes external to the organization. The table also shows the total cost of the **Job**. The last row of the table shows the average of each of the columns across **Jobs**. These measures are useful if you are doing analysis on individual jobs.

- **Resources Table:** This table shows the busy and idle duration for each **Resource** as well as the degree of utilization of the resource. The table also shows the time that **Tasks** were pending due to a shortage of a resource as well as the cost of having the resource idle. The total cost attributed to each resource that was used for all **Jobs** is also calculated. These measures are useful for assessing the adequacy of resource levels for the process.

- **Activities Table:** This table gives time and cost measurements for **Tasks** and **Processes** such as time spent working on **Jobs**, time spent waiting to start, and time

spent waiting for blocked resources. The table provides a throughput measure, which is the number of **Jobs** processed by a **Task** or Sub-Process per unit of time. It also specifies the number of times a **Task** or sub-process was completed. Similar to other tables, it also provides the total cost associated with the activity. These measures are useful for estimating the capacity of the process.

- *Queues Table:* The Queues table shows the behavior of the queues attached to each **Task**. This includes the average and maximum number of items in the queue as well as the average queue duration. These queue measures are useful for identifying process bottlenecks.

Scenario 1 (Disaster Scenario) The following are some high-level results from the different simulations that were run.

From the simulated statistics in the as-is model, only 107 (10.7%) of the 1,000 claims were processed by the end of Day 2. The simulation also shows that after Day 3 and Day 5, the number of claims processed did not change. This is a result of processing time at the Glass Company and Insurance Company as well as the transfer (mailing) time required to send documents to each party as well as from Zyco to the Agents.

The results of as-is simulations demonstrate that 893 (1000-107) claims would be carried into the following two weeks before being completed. In addition, 1,000 new claims would be introduced into the process in week 2 which would lead to only 107

TABLE 6-9 SIMULATION RESULTS FOR THE SCENARIO 1 (DISASTER SCENARIO)*

5-Day Simulation Statistics					
Scenario	Claims simulated	Claims processed	% of claims processed	Utilization of agent staff (10 staff)	Utilization of claims staff (3 staff)
As-Is	1000	107	10.7%	32.56%	27.81%
To-Be	1000	1000	100%	8.18%	33.32%
3-Day Simulation Statistics					
Scenario	Claims simulated	Claims processed	% of claims processed	Utilization of agent staff (10 staff)	Utilization of claims staff (3 staff)
As-Is	1000	107	10.7%	54.27%	40.81%
To-Be	1000	992	99.2%	11.19%	45.73%
2-Day Simulation Statistics					
Scenario	Claims simulated	Claims processed	% of claims processed	Utilization of agent staff (10 staff)	Utilization of claims staff (3 staff)
As-Is	1000	107	10.7%	81.24%	61.09%
To-Be	1000	928	92.8%	16.69%	59.11%

*The numbers may differ depending on the random numbers generated and the Simulation Start Time (If "Standard Calendar" is used in the simulation)

being completed from these and another 893 claims being added to the 893 claims from the previous week. With this constant backlog of claims, there will come a point where the current staffing levels will not be able to cope with the workload and will lead to backlogs.

The statistics generated from the To-Be Model indicates that by Day 5, 100% of the Windshield Claims had been processed. Surprisingly, by the end of Day 2, 92.8% had been processed and, by the end of Day 3, 99.2% had been processed.

Scenario 2 (Growth Scenario) Table 6–10 shows a summary of the simulation for Scenario 2.

This information becomes very important for Zyco as now they can determine that by implementing the to-be process, the Claims Staff would be able to process 2,000 claims without adding to staff. The utilization rate of Claims Clerk is below 50 percent and percent of claims processed is above 70 percent in the 5 day simulation for the To-Be process. That shows that the new process will be able to handle 2,000 or more claims a week. Note that the % of claims processed is not 100% even though the staff is not fully utilized, which is different from Scenario 1. That is because in Scenario 2 there are some jobs created on the 4th and 5th day, while in Scenario 1 all the jobs are created on the 1st day. This information becomes very important for Zyco as now they can determine that by implementing the To-Be model, the Claims Staff would be able to

TABLE 6–10 SIMULATION RESULTS FOR SCENARIO 2 (GROWTH SCENARIO)*

5-Day Simulation Statistics					
Scenario	Claims simulated	Claims processed	% of claims processed	Utilization of agent staff (10 staff)	Utilization of claims staff (3 staff)
As-Is	1958	206	10.52%	66.68%	47.72%
To-Be	1958	1444	73.75%	8.72%	42.52%
3-Day Simulation Statistics					
Scenario	Claims simulated	Claims processed	% of claims processed	Utilization of agent staff (10 staff)	Utilization of claims staff (3 staff)
As-Is	1170	132	11.28%	66.19%	44.32%
To-Be	1170	725	61.97%	7.89%	41.19%
2-Day Simulation Statistics					
Scenario	Claims simulated	Claims processed	% of claims processed	Utilization of agent staff (10 staff)	Utilization of claims staff (3 staff)
As-Is	815	95	11.66%	67.79%	49.18%
To-Be	815	307	37.67%	8.34%	31.30%

*The numbers may differ depending on the random numbers generated and the Simulation Start Time (If "Standard Calendar" is used in the simulation)

TABLE 6-11 COMPLETED JOBS AT THE END OF THE SIMULATION

	Number of jobs	Completed at the day 5		% Completed	
		As-is	To-be	As-is	To-be
Jobs created during the first 2 days	815	97	815	11.9%	100%
Jobs created during the first 3 days	1170	134	1170	11.5%	100%
Jobs created during the first 4 days	1399	152	1399	10.9%	100%

process 2,000 claims without adding to staff. The utilization rate of Claims Clerk which is below 50% and % of claims processed which is above 70% in the 5 day simulation for the "To-Be" process shows that to new process will be able to handle 2,000 or more claims a week. Note that the % of claims processed is not 100% even the staff is not fully utilized, which is different from the Scenario 1. It is because in Scenario 2 there are some jobs created in the fourth and fifth day while in Scenario 1 all the jobs were created in the first day. This can be seen in Table 6-11 which shows percent of completion at the end of simulation for the jobs created during the first 2, 3, and 4 days. In the as-is process, the completed jobs are around 10% regardless of the creation date. In the to-be process, all the jobs created before the 4th day have been processed at the end of the 5th day. The ability to generate this type of information will assist Zyco in capacity planning.

This information can also be used for calculating staffing models at budget times (determining the impact of additional claim volumes on the current staff or required next year), as well as estimating required staff to support additional volumes during mergers and acquisitions. With the results of the simulation, Zyco can now take informed proactive action rather than just react to change.

6-1-7 Partner Impact and Process Reengineering Reports

(1) **Partner Impact Report** The Partner Impact Report provides a summary of the "hard" quantifiable benefits and the "soft" qualitative benefits to the different partners involved in the process. For the windshield repair claims process that includes Zyco, the agents, and the glass repair shops as well as the customer. Table 6-12 shows the hard benefits for the different partners based on the comparison of the as-is and to-be processes for 1,000 claims per week. In addition, there are soft benefits. The benefits of the process redesign can be summarized as follows:

Customer Benefits (See Tables 6-2 and 6-5)

- Cycle time reduced by 8.8 days (from 10.29 days to 1.45 days)
- Total processing time reduced by 6.5 days (from 6.89 days to 0.42 days)
- "One-stop shopping" when an insured requires having a windshield claim processed.

TABLE 6-12 PARTNER IMPACT ANALYSIS—COMPARISON OF THE "AS-IS" AND "TO-BE" AUTO WINDSHIELD REPAIR CLAIM PROCESS

Hard benefits for agent	Time savings per call (in min)	% occurrence	Number of claims (per year) ³	CSR salary (per year)	Time savings (hours)	Time savings in FTE (2080hr/yr)	Cost savings
Elimination of Current Phone Calls from Glass Shops	15.00	1.00% ²	52,000	\$25,000	130	0.0625	\$1,563
Total Reduction of Current Phone Calls from Insureds @ 80%		90.00%	52,000	\$25,000	7134	3.4	\$85,750
<i>Total Time Required for Phone Calls To-Be from Insured (if denial) @ 8%</i>		89.10%	52,000	\$25,000	-562	-0.3	-\$6,750
TOTAL IMPACT—PHONE CALL REDUCTIONS					6703	3.2	\$80,563
Elimination of Current Claim Denials from Insured Phone Calls @ 80%	15.00	10.00%	52,000	\$25,000	1019	0.5	\$12,250
<i>Effort Required under To-Be (if denial) @ 8%</i>	18.00	10.00%	52,000	\$25,000	-725	-0.1	-\$1,500
TOTAL IMPACT—CLAIMS DENIAL REDUCTIONS					894	0.4	\$10,750
Hard benefits for Zyco	Time savings per call (in min)	% occurrence	Number of claims (per year)	CSR salary (per year)	Time savings (hours)	Time savings in FTE (2080hr/yr)	Cost savings
Elimination of Phone Calls from Glass Shops	15.00	1.00% ²	52,000	\$25,000	130	0.1	\$1,563
Total Reduction of Current Phone Calls from Insureds @ 20%		90.00%	52,000	\$25,000	1325	0.6	\$15,925
<i>Total Time Required for Phone Calls To-Be from Insured (if denial) @ 8%</i>		89.90%	52,000	\$25,000	-747	-0.1	-\$1,771
TOTAL IMPACT—PHONE CALL REDUCTIONS					1308	0.6	\$15,717
Elimination of Current Claim Denials from Insured Phone Calls @ 20%	15.00	10.00%	52,000	\$25,000	255	0.1	\$3,063

Continued on next page

TABLE 6-12 PARTNER IMPACT ANALYSIS—COMPARISON OF THE "AS-IS" AND "TO-BE" AUTO WINDSHIELD REPAIR CLAIM PROCESS (Continued)

Hard benefits for agent	Time savings per call (in min)	% occurrence	Number of claims (per year)	CSR salary (per year)	Time savings (hours)	Time savings in FTE (2080hr/yr)	Cost savings
Effort Required under To-Be Template (if denial) @ 2%	78.00	10.90%	52,000	\$25,000	-37	0.0	-\$375
TOTAL IMPACT—CLAIMS DENIAL REDUCTIONS					224	0.1	\$2,688
Hard benefits for glass shop	Time savings per call (in min)	% occurrence	Number of claims (per year)	CSR salary (per year)	Time savings (hours)	Time savings in FTE (2080hr/yr)	Cost savings
TOTAL IMPACT—CLAIM VALIDATION AT GLASS SHOP	15.00	2.00% ¹	52,000	\$20,000	260	0.1	\$2,500

¹Percentage of calls that go directly to the glass shop (2%)²Percentage of calls that go directly to the glass shop (2%) x Percentage that the glass shop calls the agent to verify coverage (assume 50%)³Claims per week (1,000) x 52 weeks

Agent Benefits (See Table 6-11)

- Elimination of phone calls from insureds/glass shops to verify coverage—*savings of ~\$81,000/year or added capacity of ~3.2 FTE (Full Time Equivalent).*
- Elimination of denials where the insured has no glass coverage—*savings of ~\$11,000/year or added capacity of ~0.4FTE.*
- Enhanced customer service to their clients.

Zyco Company Benefits (See Table 6-11)

- Elimination of phone calls from insureds/glass shops to verify coverage—*savings of ~\$16,000/year or added capacity of ~0.6 FTE.*
- Elimination of denials where the insured has no glass coverage—*savings of ~\$2,700/year or added capacity of ~0.1 FTE.*
- Added capacity (for company and agent combined) of approximately 15,000 hours per year = ~7.3 FTE.
- Cost savings of approximately ~\$149,000 per year.
- Minimizing fraud exposure.

Glass Shop Benefits (See Table 6-11)

- Elimination of phone calls from insureds/glass shops to verify coverage—*savings of ~\$2,500/year or added capacity of ~0.1 FTE.*
- Customer service is enhanced by confirming coverage and deductibles online.
- Less financial exposure by not charging wrong deductibles or repairing wind-shields for uninsured customers.

(2) Process Reengineering Report The Process Reengineering Report can have many formats and flavors depending on the audience and the context. For an executive audience, it can be a summary report summarizing the impacts of the process redesign on the various business partners and provides recommendations. For the implementers of the new process, it will contain detailed analysis similar to the tables and analyses presented in this chapter.

DESIGNING COLLABORATIVE SUPPLY CHAIN PROCESSES FOR e-BUSINESS¹

7-1 UNDERSTANDING MISALIGNMENTS AND COLLABORATIVE OPPORTUNITIES IN SUPPLY CHAINS

7-2 REDESIGNING SUPPLY CHAIN PROCESSES: REENGINEERING FROM THE OUTSIDE-IN

7-3 ROSETTANET EXAMPLE: DESIGNING e-BUSINESS PARTNER INTERFACE PROCESSES FOR THE IT-INDUSTRY SUPPLY CHAIN

7-3-1 Understanding the Process Structure of a Supply Chain

7-3-2 Designing e-Business PIPs for a Supply Chain Process

WHAT CHAPTER 7 IS ABOUT

This chapter takes business process redesign beyond the enterprise level to the supply chain level. It shows how to design collaborative supply chain processes for e-business when there are multiple partners doing business with each other. The chapter explains how supply chain process redesign should take place at both the supply chain level and the enterprise level. The method advocated is to design the partner interface processes (PIPs) at the supply chain level first, and then to redesign the enterprise processes around the common PIPs. The chapter explains the steps of designing e-business PIPs through examples in the context of supply chain processes in the IT-industry supply chain.

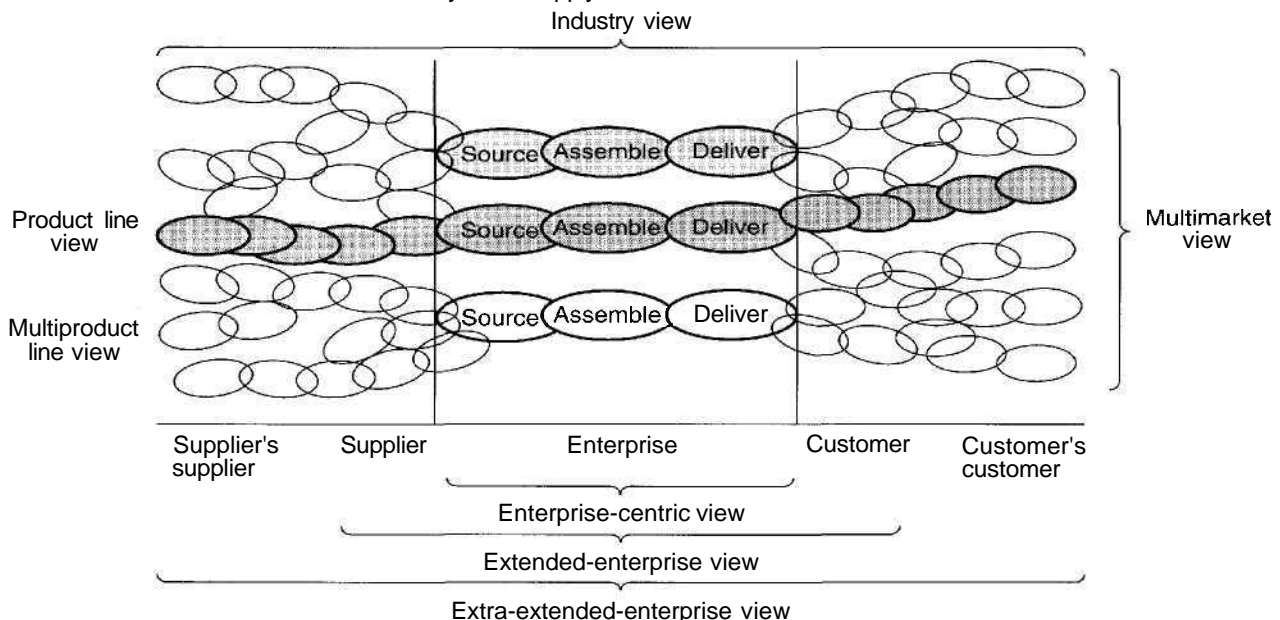
¹This chapter draws on joint work between the RosettaNet Consortium, Holosofx, and USC Marshall School of Business. The contribution of the many people involved from the three organizations is gratefully acknowledged. The examples are adapted from modeling by Eric Olson and Jasmine Basrai of Holosofx.

7-1 UNDERSTANDING MISALIGNMENTS AND COLLABORATIVE OPPORTUNITIES IN SUPPLY CHAINS

A supply chain is typically depicted as linking a set of enterprises tied together through a set of business processes that provide products and services to a business customer. These business processes include both operational processes and planning processes. The generic form of the operational processes has been characterized as a sequence of “source-assemble-deliver” activities. Sourcing involves the acquisition of resources needed to configure an offering (product or service). Assembly of an offering involves manufacturing or configuration of a product, or bundling and preparation of a service. Delivery involves the distribution of the product and/or provision of the service to the customer. However, it is unclear how many repeated sequences of these activities should be viewed as the supply chain (see Figure 7-1). There are several possible levels of analysis:

- An *enterprise-centric view* of supply chain processes that focuses mainly on business processes within an enterprise and how they interface with partners.
- An *extended-enterprise view* of supply chain processes that extend further to the customers' customers and the suppliers' suppliers.
- A *singular thread view* of supply chain processes at divisional levels that a given product family flows through.
- An *industry view* of supply chain processes that includes multiple enterprises, multiple product lines, and multiple markets.

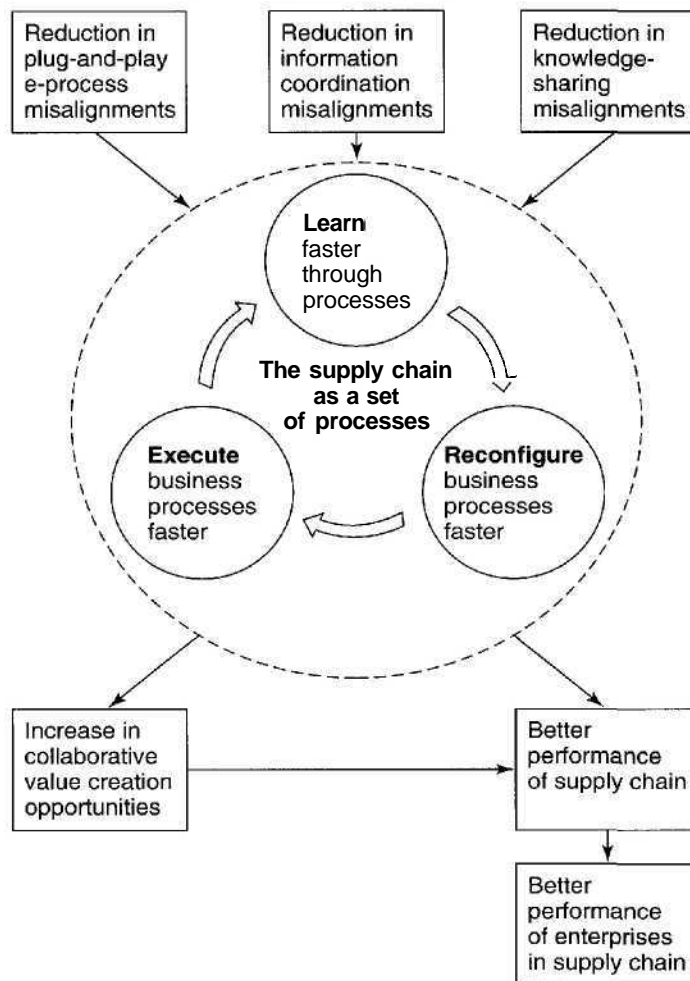
FIGURE 7-1 Alternative levels of analysis of supply chain boundaries



Understanding which of these views we mean when we talk about supply chains is important before reorganizing for e-business and reconfiguring supply chains. A supply chain view that is enterprise-centric may yield internal economies of scale and scope, but perhaps at the expense of generating misalignment problems across partners in the end-to-end supply chain. With e-business there is more temptation to view a broader and longer supply chain because of the facilitated information exchange and collaboration opportunities among diverse partners, although the management challenges are much greater.

In order to better understand the principles and tactics of redesigning enterprise processes for e-business, Chapter 3 presented the e-business speed loop framework at the enterprise level. In the e-business speed loop, enterprises compete and quickly exploit new opportunities offered by e-business through faster execution of three sets of

FIGURE 7-2 The e-business speed loop for the supply chain



strategic capabilities: the capability to reconfigure business processes faster, the capability to execute business processes faster, and the capability to learn faster through business processes. There is a similar e-business speed loop at the supply chain level. It is shown in Figure 7–2.

The performance of the supply chain as a set of processes can be viewed as being hampered by misalignments across the supply chain. These misalignments exist due to the historical baggage of enterprise-centric views prior to the emergence of e-business. Thus enterprises at the supply chain level have the same "isolated silo" problems that functional departments have at the enterprise level—but they are magnified several times as partners and products change much more quickly, the scale and heterogeneity is much larger, and process changes can only be implemented across supply chains through collaboration and consensus. Misalignments in the supply chain can be viewed as three types:

1. Plug-and-Play e-Process Misalignments This type of misalignment has to do with a business process not being able to interface correctly with a business process in another enterprise; thus the two enterprises cannot plug-and-play quickly. By e-process, we mean a process that is being executed through two computer applications talking to each other. This type of misalignment is not at the technology level, however, but at the business process level. While the two e-processes can send messages to each other, they cannot execute collaboratively because the interface dialogue does not trigger the correct process sequences. This severely limits the capability of the enterprises to smoothly execute joint transactions.

When two enterprises need to resolve that misalignment, they collaboratively agree on what the common interface should be so that they can plug-and-play their business processes together and adjust them accordingly. This takes months to implement. Furthermore, this is typically a proprietary special-purpose interface, and the same laborious time-consuming and expensive implementation is repeated when the enterprise needs to engage either with an e-process from a different partner or with a different process or product with an existing partner. For example, if there are no common standards for electronic business interfaces, a retailer must build, learn, and use different ordering procedures and system interfaces for each distributor or manufacturer it deals with.

This type of misalignment is especially problematic in dynamic industries and in e-business where the rate of introduction of new products and services is high and the necessity to interface with new enterprise partners is frequent. It limits the ability to add new products and services quickly in the supply chain as well as the ability to quickly add new partners. Furthermore, even with existing products and partners, there may still be insufficient flexibility for accommodating process exceptions.

2. Information Coordination Misalignments This type of misalignment has to do with difficulty in synchronizing information exchange and coordination across the supply chain. As a supply chain process is being executed, it is delayed and cannot be executed automatically because information flows are not easily integrated into the process and are not synchronized. This is caused by nonautomated and nonstandard interfaces for the exchange of information content and status information. Thus nonstandard forms

and different SKU (stock keeping unit) numbers for the same part across different enterprises contribute to this type of misalignment, as does the lack of standardized electronic interfaces. The adoption of EDI (Electronic Data Interchange) standards has somewhat eased this type of misalignment in terms of transactional and status information, but not in terms of common taxonomy to classify product information from different vendors across the supply chain.

This type of misalignment is problematic in terms of the dysfunctional performance aspects it causes in the supply chain due to delayed or inaccurate information. When inventory query responses are delayed or inaccurate, this raises inventory levels and lengthens order processing times. Then the performance of the entire supply chain drops. The cost of doing business goes up significantly and some business options (channel assembly, for example) are seriously hampered. To execute supply processes quickly and leanly, information coordination misalignments need to be minimized.

3. Knowledge Sharing Misalignments This type of misalignment limits the extent of collaborative knowledge sharing and joint knowledge creation across enterprises in the supply chain. As explained in Chapter 3, knowledge management around a process implies taking advantage of collective expertise to intelligently create, capture, deploy, share, preserve, and reuse knowledge. Knowledge misalignments inhibit the intelligent management of knowledge around supply chain processes, thus limiting the ability to improve the performance of the supply chain. For competitive reasons, not all knowledge is desirably shared with other enterprises. There is a substantial portion of knowledge sharing, however, that is necessary for a supply chain's performance and future opportunities to improve. This is especially true in dynamic industries where changes occur quickly and product life cycles are short. Collaborative knowledge sharing among enterprises in a supply chain includes such activities as sharing of market knowledge and trends, sharing knowledge for joint marketing programs, collaborative demand forecasting, and sharing expertise around joint product and service design.

While knowledge sharing can be inhibited by the enterprise's unwillingness to share knowledge, it can also be inhibited for more technical reasons. As knowledge sharing is fueled by information flow, it requires much richer and more qualitative information than transactional or status information. Unless the information infrastructure in the supply chain accommodates the exchange of such rich information across enterprises in the supply chain, there will be knowledge-sharing misalignments that hamper performance. For example, product returns is an expensive process in any supply chain. It requires reverse logistics and exception processes and signals an unhappy customer (it is very useful to understand why the product was returned so that future returns can be avoided). The absence of a common RMA (Return Materials Authorization) format with qualitative textual explanation and a way to route it across the supply chain inhibits rapid knowledge sharing about the reasons for product returns. Thus a distributor will neither be able to easily find out why a product was returned, nor will the distributor transmit this knowledge back quickly to the manufacturer. This knowledge-sharing misalignment hampers performance and limits the ability to spot future opportunities.

The reduction of these three types of misalignment contributes to both better performance of the supply chain (faster, cheaper, better quality, better service, and more

flexible offerings) and an increase in value creation opportunities across the supply chain (new services and products, new ways of offering them, links to other supply chains). This typically translates into better performance of each enterprise in the supply chain—they redesign their enterprise processes to take advantage of the supply chain process changes.

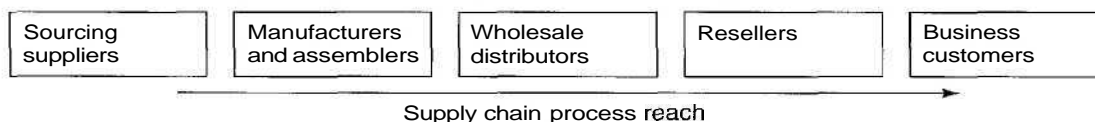
7-2 REDESIGNING SUPPLY CHAIN PROCESSES: REENGINEERING FROM THE OUTSIDE-IN

A traditional supply chain has several tiers of enterprise types that enable the flow of products and services, as shown in Figure 7–3. For example, in a manufacturing supply chain, there are sourcing suppliers who produce components that are then assembled by manufacturers. That portion of the supply chain is called the *sourcing* or *buy* side. Then manufacturers distribute their products through wholesale distributors, who in turn make them available to resellers and retailers, who sell them to business customers. That portion of the supply chain is called the *sell* side or *distribution* side. The flow of the product is also assisted by various types of flow partners: shippers (for product flow), financiers (for flow of funds), and IT infrastructure providers (for flow of information). A supply chain process passes through all these enterprises, and redesigning supply chain processes for collaborative advantage in e-business requires a strategy that goes beyond the enterprise level and has a cross-enterprise perspective.

The previous chapters have shown how to redesign business processes at the enterprise level. How do we redesign business processes at the supply chain level that span several enterprises? Should the supply chain process be viewed as one long collaborative process that is carried out jointly by several enterprise partners, or should it be viewed as a string of enterprise processes (each of which is carried out by one enterprise) that are glued together through partner interface processes? Either of the approaches is possible, but the collaborative process approach does not scale up well beyond two partners and is not amenable to standardization or process design reuse. Most importantly, the partner interface process approach is more favorable for reducing the three types of misalignments that hamper the performance of supply chain processes: plug-and-play process misalignments, information coordination misalignments, and knowledge-sharing misalignments.

The partner interface process view of supply chain processes is shown in Figure 7–4. The partner interface process (PIP) is comprised of the "touch-point" activities and dialogue that are at the interface between two enterprise processes. Note that a PIP is a

FIGURE 7–3: Examples of types of enterprises in a tiered supply chain



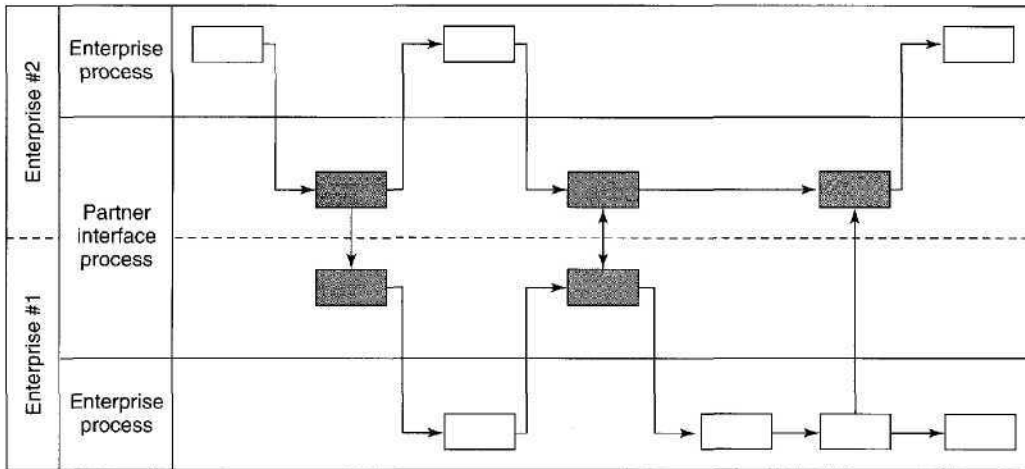


FIGURE 7-4 Partner interface process as touch-point activities between enterprise processes

business process that is sensitive to business rules, rather than just a message exchange. Different process sequences are triggered depending on conditions, business rules embedded in the PIP, and resultant choices. In e-business, the PIP is preferably automated and standardized so that it can be reused across many enterprises.

There are two basic types of PIPs: open PIPs and closed PIPs. Open PIPs are standards that can be shared across an industry and are reusable designs, whereas closed PIPs are private between two or more partners and are only reusable within that context. The PIP approach to redesigning supply chain processes for e-business has a two-part sequence. First, the PIP is designed at the supply chain level, and then the enterprise processes are aligned with and redesigned around the PIP. Thus it is reengineering business processes from the outside-in: first at the supply chain partner interface level outside the enterprise and then inside the enterprise. The steps are diagrammatically shown in Figure 7-5.

There are 5 steps at the supply chain level:

- *Step #1 Scoping the Supply Chain Process:* The boundaries of the supply chain process are defined as are its various scenarios and sub-processes.
- *Step #2 Identifying Partner Interface Processes within the Supply Chain Process:* Identifying the main PIPs in the supply chain process through the grouped interactions between sub-processes across partners.
- *Step #3 Designing the To Be e-Business Partner Interface Processes:* Designing e-Business PIPs to reduce misalignments in the supply chain process. Each PIP is specified in terms of both process flow sequences and the structure and format of messages that are passed through the PIP.
- *Step #4 Estimating and Articulating Expected Impacts Due to PIPs:* Process analysis can be done for the PIPs in terms of process performance change. The nature and extent of impacts on the reduction of misalignments are articulated.

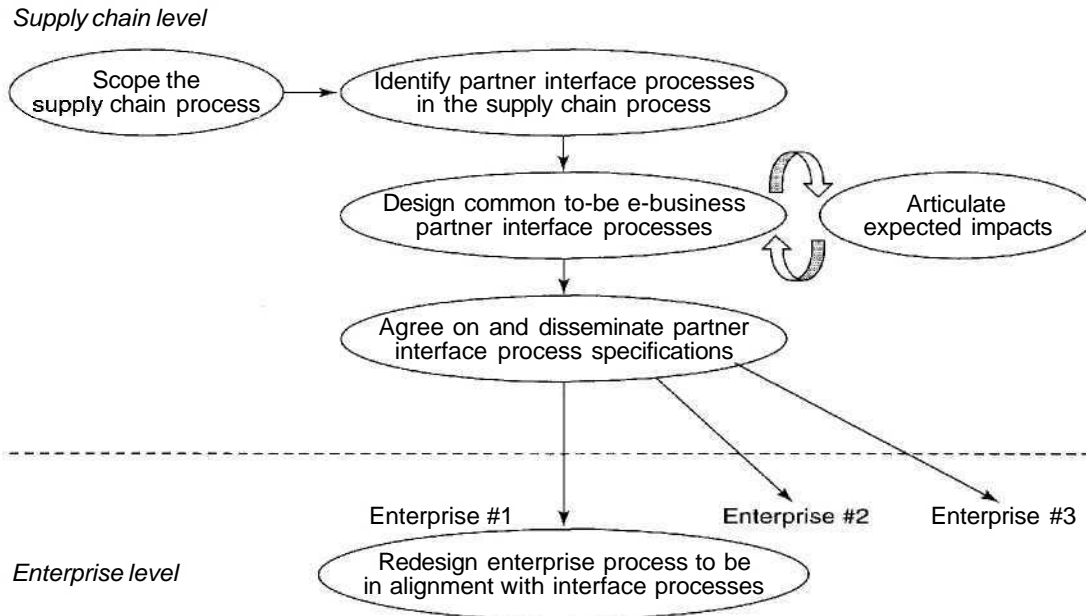


FIGURE 7-5 Supplychain level and enterprise level business process redesign for e-business

- *Step #5 Agreeing on and Disseminating the Partner Interface Process Specification:* Agreement among enterprise partners on the PIP specification is reached, and the specification is shared and disseminated among supply chain partners.

The process redesign can then move to the enterprise level:

- Enterprise processes in each partner enterprise are redesigned to be in alignment with the PIPs.

The steps are explained in more detail through an example in the next section.

7-3 ROSETTANET EXAMPLE: DESIGNING e-BUSINESS PARTNER INTERFACE PROCESSES FOR THE IT-INDUSTRY SUPPLY CHAIN

In early 1998, about 30 leading companies in the information technology industry (IT) were brought together through the RosettaNet Consortium. The mission of RosettaNet was to design, adopt, promote, and facilitate the deployment of open common electronic business interfaces between business partners in the IT-industry supply chain. The IT industry realized that, with the emergence of e-business, it could no longer afford to postpone attention to efficient business process interfaces between supply chain trading partners.

The supply chain misalignment issues are especially pronounced in the IT industry, a fast-moving industry where new product introductions are very frequent; there are

hundreds of new suppliers that emerge every year. Plug-and-play process misalignments are expensive and very time-consuming. IT also has complex products that create the need for partnerships, a high need for technical support, and a complex component sourcing tree. The IT industry realizes it operates as a series of smokestacks, with manufacturers, distributors, resellers, and business customers operating efficiently within their own boundaries. When it comes to coordinating activities and sharing information and knowledge with other organizations, however, the industry realized that their processes could stand improvement.

This is how RosettaNet describes the IT industry's supply chain issues. In their words:

- Manufacturers use complex processes to all but guess inventory levels and locations across the supply chain at any point in time. This is because there is no agreement on something as simple as how a part number is defined or how inventory queries can be made through a standard interface. This significantly impacts production planning, channel allocation, and the cost of returns.
- Distributors, who provide pre- and post-sale technical support to their resellers on tens of thousands of SKUs, must grapple with disparate forms of product information collected from hundreds of manufacturers with no common taxonomy. The lack of product information standards makes the current aggregation and dissemination of such content an expensive and inefficient proposition, an effort duplicated by each distributor in the channel. This problem is further compounded by the content's explosive rate of change.
- Resellers must learn and maintain different ordering/return procedures and system interfaces with each distributor and direct manufacturer with whom they trade, causing them to spend valuable resources in back-office operations (50 percent by some estimates), which they could otherwise use to make new sales or service their customers.
- End users have no mechanism enabling effective procurement through uniform templates, which can be contextually linked to government-authorized schedules. This often causes a nonsensical lengthening of the purchasing cycle whereby most PC orders are old technology by the time they make it through this inefficient cycle and onto the desk of the requisitioner.

It was time to collectively resolve to develop a set of industrywide electronic business interoperability standards. The lack of standardized electronic business interfaces in the IT supply chain was putting a huge burden on manufacturers, distributors, resellers, and business customers, creating tremendous inefficiencies, and ultimately inhibiting the ability to leverage the opportunities brought about by e-business. The aim was to reduce the supply chain misalignments and to increase value creation opportunities for the entire IT industry supply chain. The focus was mainly on the assembly and distribution side of the supply chain rather than on the sourcing side.

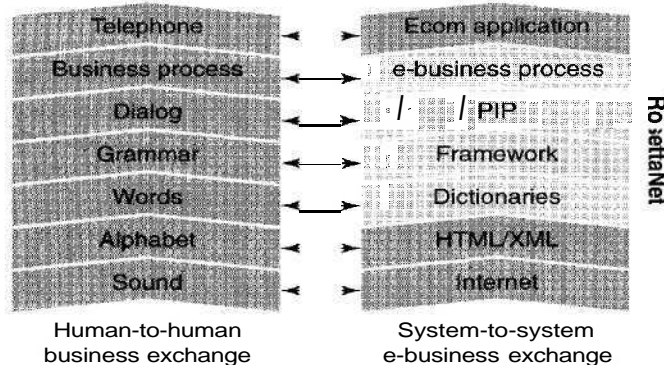
RosettaNet (www.rosettanet.org) is comprised of about 30 global board member companies. They include hardware manufacturers (such as Cisco, Compaq, HP, IBM, Intel, NEC, Toshiba, 3COM), software publishers (such as Microsoft, Oracle, SAP), wholesale distributors (such as Avnet, CHS Electronics, Ingram Micro, Marshall Industries, Tech Data), resellers and system integrators (such as CompUSA, Computacenter,

EDS, Insight, MicroAge), shippers (such as Federal Express, UPS), financial institutions (such as Deutsche Financial Bank), IT infrastructure providers (such as GE Information Services, pcOrder), and some large business customer organizations (such as ABB, American Express, and GSA). The RosettaNet board member companies are responsible for defining the PIP development projects and setting the initiative's priorities. Furthermore, members of this board hold the primary responsibility for promoting and implementing these interfaces—once developed and agreed to—starting with adoption throughout their own companies and with their e-business partners. RosettaNet also partnered with other organizations in the IT supply chain to build, promote, and implement the RosettaNet PIPs. These include other standards organizations to enlarge the support base and constituency of the initiative; architect partners to provide the subject matter expertise and human resources for the PIP development project teams; execution partners to support the implementation processes; and solution partners to provide tools and services to aid companies in adopting RosettaNet PIPs. In short, this was a large-scale effort with massive industry support. However, the methodologies developed in the process of designing PIPs and collaborative supply chain processes for e-business are applicable to much smaller-scale settings and other supply chain e-business contexts.

Apart from the development of PIPs, RosettaNet has also undertaken a number of foundational projects such as the development of master data dictionaries to provide a common set of properties required by PIPs. The first is a technical properties dictionary (technical specifications for all product categories) and the second is a business properties dictionary that includes catalog properties, partner properties (attributes used to describe supply chain partner companies), and business transaction properties. Figure 7-6 shows the parallel between a human-to-human exchange and a computer-to-computer e-business exchange. PIPs are the dialog between e-business processes.

In the last section we outlined the steps for the PIP approach to redesigning supply chain processes for e-business. The first part of the sequence is designing the PIP at the supply chain level; the steps were outlined in Section 7-2 (see also Figure 7-5). We will explain these steps in more detail in the context of an example PIP process from the

FIGURE 7-6



RosettaNet context. We start first by showing how to identify and categorize supply chain processes in an industry supply chain.

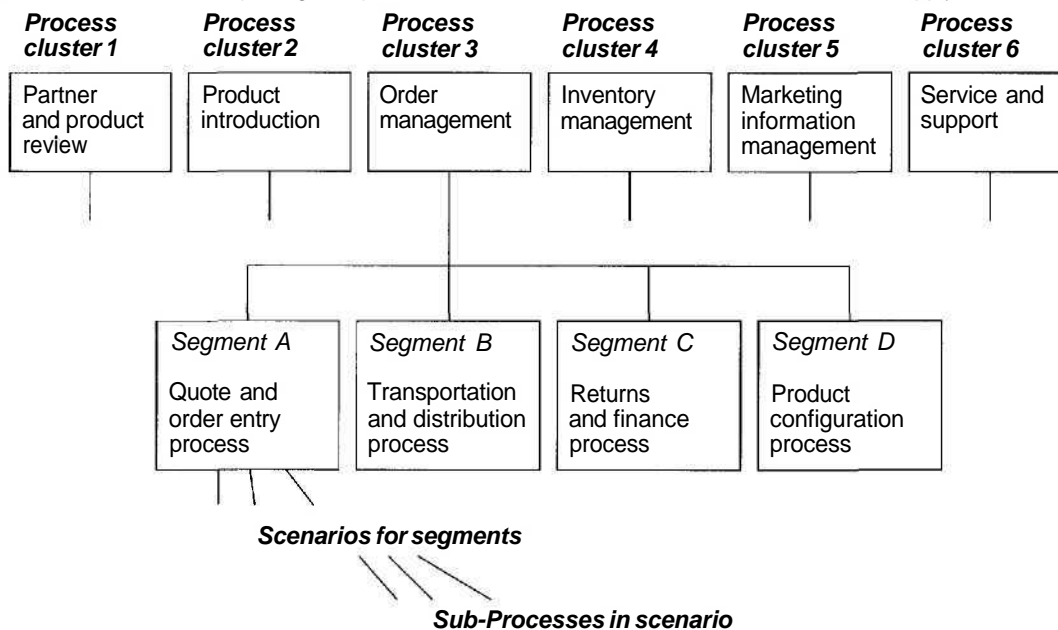
7-3-1 Understanding the Process Structure of a Supply Chain

Every supply chain has a universe of supply chain processes. This is the entire set of business processes that represent the interactions between the partners in the supply chain. They are the core cross-enterprise processes that make up the supply chain in order to provide products and services to customers.

The RosettaNet Consortium's view of the supply chain was an industry view that focused on the distribution side of the IT industry supply chain. They realized that they needed better understanding and consensus on what the universe of supply chain processes was so that they could begin to design common electronic business interfaces that had the most impact on the performance of the IT industry supply chain. They also realized that in order to do so, they had to devise a structural framework for systematically identifying process groupings. They organized the universe of supply chain processes into a hierarchy of process clusters and segments.

Supply Chain Process Clusters: A cluster is a grouping of related supply chain processes that represent at a very high level the interactions between enterprises in the supply chain. Six process clusters were identified for the IT supply chain (see Figure 7-7). Clusters 1 and 2 are related to new product introduction, a very frequent activity in the IT industry. Clusters 3 and 4 are related to order management and managing inventory, traditional supply chain processes around which many ERP systems are deployed.

FIGURE 7-7 Decomposing the process structure of the distribution side of the IT supply chain



Clusters 5 and 6 are closely related to customer relationship management. These clusters were determined by interviews with managers of participating companies, knowledge of common and emerging business practice, and business logic.

Supply Chain Process Segments: Each cluster can be divided into several business process *segments* that are finer-grained categorizations. These are also cross-enterprise processes that go across more than one partner in the supply chain (rather than internal enterprise processes). For example, the Order Management process cluster was categorized into four segments (see Figure 7–7): (A) the quote and order entry process, (B) the transportation and distribution process, (C) the returns and finance process, and (D) the product configuration process. This is the level around which e-business PIPs can be designed.

Partner Scenarios and Sub-Processes: Each business process *segment* will have multiple partner scenarios. A partner scenario is a process segment configuration with particular types of partners. For example, a returns process might involve the business customer, the manufacturer, the shipper, and the financial institution (one scenario); it might also involve the wholesale distributor and the reseller in addition (a second scenario); and so on. Each of these scenarios is a different end-to-end business process with different steps and partner interaction processes. Each partner scenario can also be decomposed into several sub-processes to facilitate process modeling and understanding of the PIPs.

7–3–2 Designing e-Business PIPs for a Supply Chain Process

Step #1: Scoping the Supply Chain Process The boundaries of the supply chain process are defined as well as its various scenarios and sub-processes.

The method that the RosettaNet Consortium used to scope a supply chain process at the segment level was through intensive two-day off-site workshops around each of the six process clusters in the supply chain. The workshops were attended by high-level subject matter experts at the executive and managerial level from participating companies and process redesign facilitators to both conduct and document the workshop activities and deliverables. The subject matter participants were selected to represent the different supply chain tiers (manufacturers, distributors, resellers and so on).

Scoping a supply chain process involves the following:

- *Understanding how the supply chain process (segment) fits into the supply chain process cluster:* If the redesign activity starts at the segment level, it is important to understand which cluster the supply chain process is part of. For example, suppose that we are scoping the inventory reporting supply chain process. We need to understand that it is part of the inventory management cluster and that the other related supply chain processes in this cluster are the collaborative forecasting process, the inventory allocation process, the inventory replenishment process, the sales reporting process, and the price protection process. By understanding the cluster it is in, we then know what the inventory reporting supply chain process includes and excludes.

- *Identifying partner scenarios for supply chain process:* In a tiered supply chain there may be multiple configurations depending on which tier is included or disintermediated in the supply chain process. For example, in the inventory reporting supply chain process, there is one scenario that includes the manufacturer, the distributor, the reseller, and the shipper/carrier; there is a second scenario that only involves two partners—the

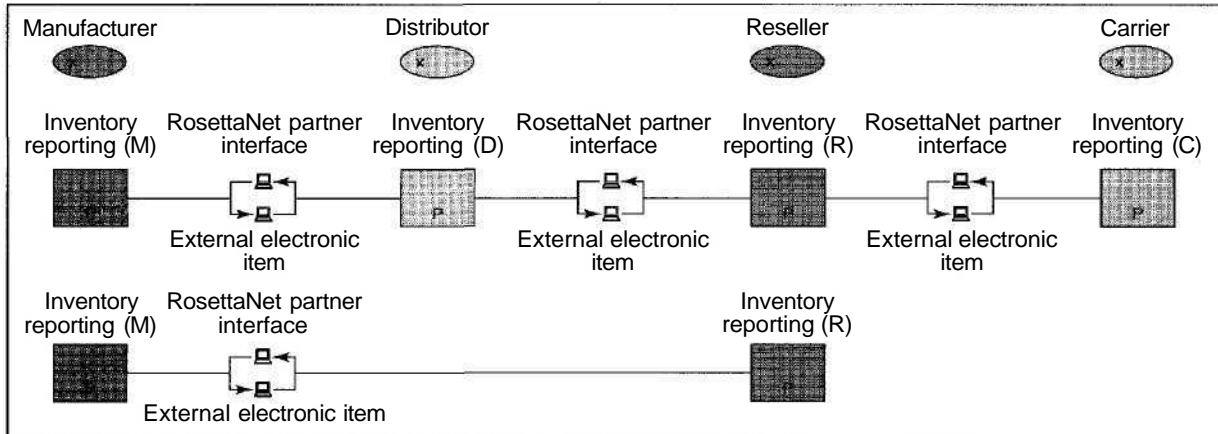


FIGURE 7-8 Two partner scenarios for the inventory reporting process

manufacturer and the reseller. This is shown in Figure 7-8.* The ovals are the partner types, and the squares vertically under them are the portion of the supply chain process within the partner enterprise. Different scenarios might require different PIP designs and it is important to identify them.

- *Identifying sub-processes within supply chain process:* The supply chain process is then decomposed into sub-processes to facilitate process modeling and the identification of PIPs. The sub-processes can also be prioritized so that redesign can focus around the sub-processes that have high priority. For example, the product introduction supply chain cluster was divided into two segment-level supply chain processes: the preparation for distribution process and the product change notification process. The

*Can be accessed on CD-ROM under RosettaNet directory in Samples directory (Inventory Reporting High Level).

TABLE 7-1 IDENTIFYING SUB-PROCESSES WITHIN "PREPARATION FOR DISTRIBUTION" SUPPLY CHAIN PROCESS

Supply chain process	Sub-processes	Priority
Preparation for Distribution	Send Purchasing and SKU Creation Information	High
	Receive Purchasing and SKU Creation Information	High
	High Send Marketing Information	Medium
	Receive Marketing Information	Medium
	Send Technical Information	Medium
	Receive Technical Information	Medium
	Send Sales Promotion and Rebate Information	High
	Receive Sales Promotion and Rebate Information	High
	Send Launch Schedule Information	Low
	Receive Launch Schedule Information	Low

preparation for distribution process was identified as having 10 sub-processes as shown in Table 7-1. At this point, the supply chain process is scoped sufficiently for its various PIPs to be identified.

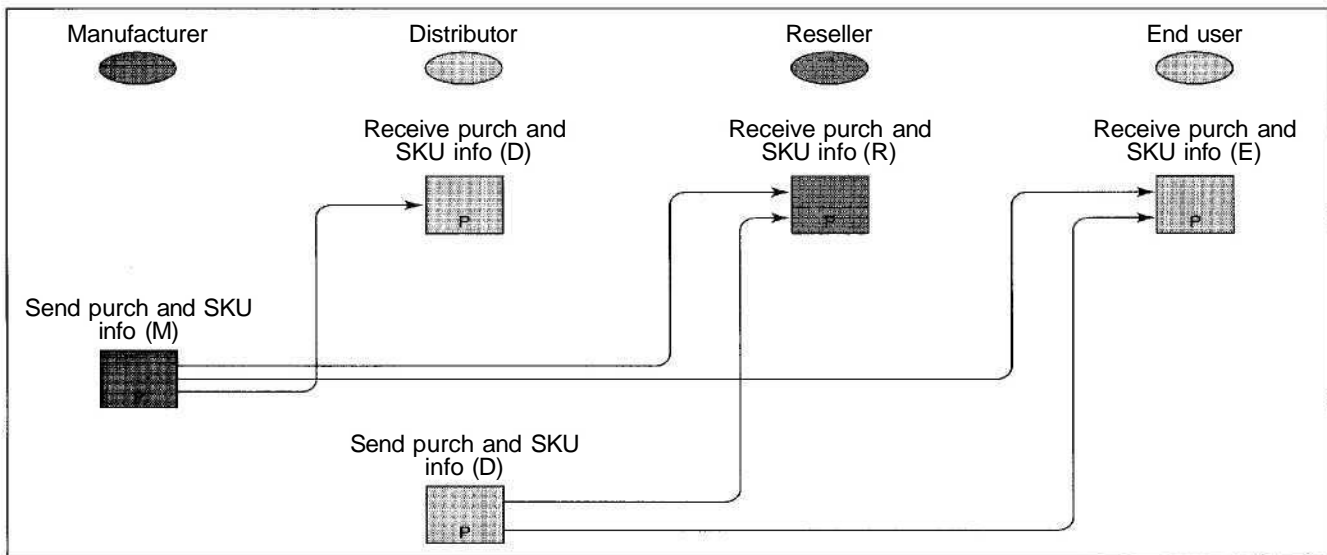
Step #2: Identifying the e-Business PIPs Identifying the main PIPs in the supply chain process through the grouped interactions between sub-processes *across partners*.

Having identified the sub-processes that comprise the supply chain process, the partner types (manufacturers, resellers) that are associated with each sub-process can also be identified. It is then possible to understand the interactions between the sub-processes *across partners* as they are fulfilled by the different partner types. Groups of closely related interactions between a group of sub-processes across partners identify the boundaries of a PIP. An interaction diagram is drawn for each group of related sub-process interactions. This is repeated with all the groupings of sub-processes until all the main PIPs in the supply chain process have been identified. In the RosettaNet context, this step was done together with step 1 in the same cluster workshop.

For example, the supply chain process shown in Table 7-1 (Preparation for Distribution) has 10 sub-processes. Two of these sub-processes (Send Purchasing and SKU Creation Information, Receive Purchasing and SKU Creation Information) are obviously related together across partners. The sub-process interaction diagrams for that send-receive sub-process pair is shown in Figure 7-9.* It is to be noted that these sub-processes are full-fledged business processes (with business rules, choices, and decisions) rather than just messages.

*Can be accessed on CD-ROM under RosettaNet directory in Samples directory.

FIGURE 7-9 Interaction diagram between sub-processes across partners



Step #3: Designing the To Be e-Business PIPs Designing an e-Business PIP that reduces misalignments in the supply chain process. Each PIP is specified in terms of both process flow sequences and the structure and format of messages passed through the PIP.

After identifying the boundaries of the main PIPs around the supply chain, it is possible to design the PIPs and specify them in detail. In the RosettaNet consortium, this was done through workshops for each supply chain process (segment level). The workshops were attended by subject-matter experts from participating companies and process redesign facilitators to document the workshop activities, to do process modeling for the PIP, and to produce the PIP specifications after the workshop.

Designing an e-Business PIP around a supply chain process involves the following:


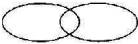
- *Identify roles, role interactions and create PIP model:* The boundaries and sub-process interactions of the main PIPs were roughly identified in Step 2. The next step is to identify the roles of the partners who perform the activities that make up a PIP. For example, let us take the example of the "Distribute New Product Information" PIP that is associated with the "Preparation for Distribution" supply chain process. The purpose of this PIP is to provide the basic information to the product buyer so that the product buyer can set up the products in his system. It also allows a Catalog Distributor to distribute new product resources to a Catalog Producer. There are three partner roles within that PIP:

- *Catalog Distributor:* The business partner who maintains and distributes new product basic information and new product resources.
- *Catalog Producer:* The business partner who receives new product resources.
- *Product Buyer:* The business partner who receives new product basic information.

Role interactions are the data interchange that goes on between two supply chain partner roles within the context of a PIP. In this PIP, two role interactions were identified:

- Basic product information being exchanged between the Catalog Distributor and Product Buyer.
- New product resources being exchanged between the Catalog Distributor and Catalog Producer.

TABLE 7-2 OBJECTS IN PIP "SWIM LANE" DIAGRAMS

Types of objects and graphical Shape	Description
<p>Role</p>  <p>(rectangle)</p>	Roles establish ownership of the activities appearing in the horizontal "swim lanes" associated with that role. Role objects are placed in the left-hand margin of a PIP diagram. All the activities in the PIP for a specific role are in its swim lane.
<p>Role Interaction</p>  <p>(interlocking ovals)</p>	A role interaction represents the data exchange between two Supply Chain partners. Role interactions contain data.

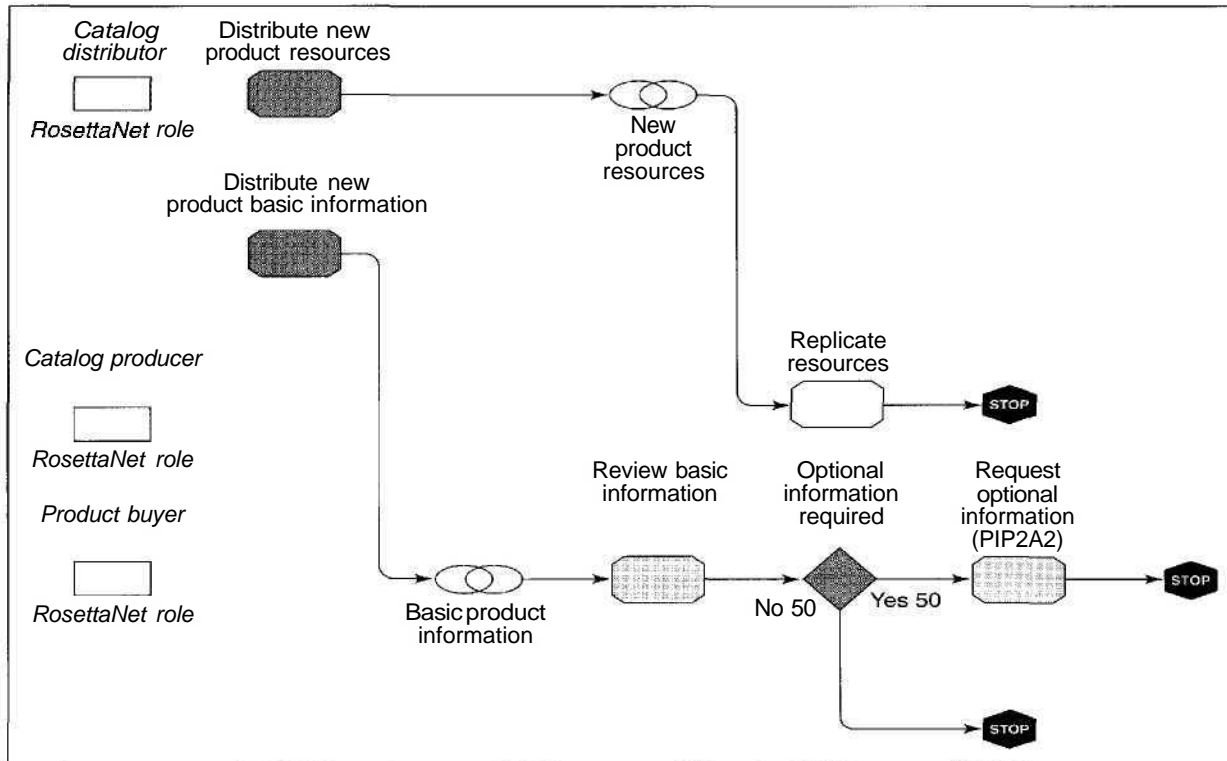


FIGURE 7-10 Process model of "Distribute New Product Information" PIP

TABLE 7-3 PIP MODEL ACTIVITIES

Activity name	Description
Distribute New Product Resources	The activity ensues subsequent to a Catalog Distributor's decision to introduce a new product and the decision to provide New Product Resources to the Catalog Producer.
Replicate Resources	Once the New Product Resources have been prepared, the Catalog Producer replicates these resources.
Distribute New Product Basic Information	The activity ensues subsequent to a Catalog Distributor's decision to introduce a new product and the decision to provide New Product Information to the Buyer.
Review Basic Information	This activity involves a buyer reviewing the Product information that was sent by the Catalog Distributor. The buyer reviews the information and determines whether or not Optional Product Information is required.
Request Optional Product Information	If the buyer determines that Optional Product Information is necessary, the buyer may then request the Optional Product Information from the Catalog Distributor by invoking PIP2A2.

The process model for the PIP is then created showing the roles, role interactions, activities, and decision points. The PIP diagram is shown in Figure 7-10 and its activities are explained in Table 7-3. Notation for roles and role interactions is shown in Table 7-2.

In order to view and model roles, role interactions, and PIPs through the Holosofx Workflow-BPR software, a different viewing mode needs to be initiated. Select the E-Commerce mode through the Editing option in the Format menu before opening any Processes. Then when opening a Process, select the Line of Visibility Process option, which creates "swim lanes" for each Role Object.

- *Define business properties of role interactions:* For each role interaction associated with a PIP, the data that is exchanged is specified through business properties and their descriptions, as well as whether they are mandatory or optional (M or O) and at what hierarchical level in the data the property appears.

Clicking on the Role Interaction in the PIP diagram opens a dialog box that allows the inputting of attributes and various fields associated with them to generate tables as shown below. Only a portion of the table is shown for illustration.*

Role interaction	Business property	Description			
New Product Basic Information Notification	Manufacturer ID (DUNS)	This is the Global Business Identifier (DUNS +4) number.	E	H	M
	Date Generated	Date the information was generated.	N	H	M
	Authorization Program Requirements	Trade sales only.		H	M
	GTIN	The one number that is used by all members in the supply chain to reference that particular product.	E	H	M

Continued on next page

Role interaction	Business property	Description			
	Supplemental Product Identification	Company-specific, though not necessarily globally unique, part numbers assigned to product for the purpose of additional product identification requirements by various members of the IT supply chain.	N	D	M
	Supplemental Product Identification Qualifier	Code identifying the type/source of the descriptive number used in Supplemental Product Identification.	E	D	M
	Brand Identifier	Code indicating the brand name of the product.	N	D	M
	Abbreviated Description	Abbreviated textual description of the product.	N	H	M
	Full Description	Full textual description of the product, including color, and other applicable attributes.	N	D	M
	Countries Available	Textual listing of all countries in which the product is available.	N	D	M
Basic Product Information (continued)	Includes	Textual listing of all equipment or accessories that are included with the product.	N	D	M
	Minimum Order Quantity	Numeric expression of the minimum number of items that may be ordered.	N	D	M
	Name	Textual name of the product.	N	D	M
	Packaged Item Height	Height of the package that contains each individual product.	N	D	M

Legend for Table

H = Header

D = Detail

E = Existing

N = New

M = Mandatory

O = Optional

- *Produce PIP specification:* A PIP specification is produced that has the PIP model, activity descriptions, role interactions, and business properties as well as some additional business control specifications such as audit control requirements.

Step #4: Estimating Expected Impacts on Supply Chain Performance Estimating the expected impacts of a to-be partner interface process on the performance of the supply chain is an important part of the supply chain-level business process redesign.

Very similar to the enterprise-level analysis in Chapter 6, the PIP design can be guided by drawing on redesign principles and tactics and running what-if analyses

using the process modeling software. The expected impact of the PIP on the segment process in particular and on the supply chain in general can be estimated to the extent possible. Financial impact analysis of the e-business PIP (cost savings) and operational impact analysis (time savings) can also be determined by comparing the performance with and without the e-business PIP. The impact analysis at this level is tricky as multiple enterprises are involved.

At the very least, articulating in qualitative terms the expected impact of the PIP on supply chain performance is useful for garnering implementation support at the enterprise level and to clarify the types of impacts that are expected. An example is shown in Table 7-4. It is for a catalog update PIP associated with the Preparation for Distribution supply chain process. The tables are derived from right to left. The sources of benefit from the PIP are first determined and then the associated supply chain capabilities derived. These translate into differences in supply chain metrics and different categories of misalignment reductions and opportunity creation. The supply chain benefits can then be further translated into financial business benefits such as increased sales and revenues.

TABLE 7-4 POTENTIAL BENEFITS OF "DISTRIBUTE NEW PRODUCT INFORMATION" e-BUSINESS PIP ON SUPPLY CHAIN MISALIGNMENTS & OPPORTUNITIES

Category of impact	Affected supply chain metrics	Associated capabilities	Source of benefit from PIP
Reduced Coordination Misalignments Improved coordination and information flows between supply and demand sides in IT supply chain	Product rollover costs. Product availability metrics.	Enhanced availability of higher quality information on product features (higher reliability, fresher, more uniform, broader diffusion).	Eliminates duplication of data entry or data conversion for changed catalog content. Partner can more easily integrate its own catalog with that of other partners or that of new channel members. Easier and quicker change propagation across multiple partners. Change in product features can be easily replicated to reflect accurate availability status.
Reduced Plug-and-Play Misalignments Increased flexibility in dynamic partnering, and in changing products & services in IT supply chain	Time-to-market for new products and services. Time to add a new channel partner.	Increased ability to unbundle/rebundle product and service offerings. Increased flexibility in changing business processes linked to partners. Increased flexibility in serving wider range of customers. Increased integration with partners.	Closer integration with partners for catalog creation and update. Partner can more easily integrate its own catalog with that of other partners or that of new channel members.

Continued on next page

TABLE 7-4 POTENTIAL BENEFITS OF "DISTRIBUTE NEW PRODUCT INFORMATION" e-BUSINESS PIP ON SUPPLY CHAIN MISALIGNMENTS & OPPORTUNITIES (Continued)

Category of impact	Affected supply chain metrics	Associated capabilities	Source of benefit from PIP
Reduced Knowledge Misalignments Increased potential for collaborative knowledge creation and sharing in IT supply chain	Percentage of customer and supplier inquiries through Web.	Increased ability to share product road maps. Increased understanding of competitive products and services. Increased ability for channel partners to provide marketing support to each other.	Allows for standardized web-enabled catalogs. Enhanced support for joint marketing programs. Uniform cross-referencing for comparison of different product lines across partners.
Increased Value Creation Opportunities Increased ability for IT supply chain to offer new products and services or to enter new markets	Rate of introduction of new products and services for customers.	Enhanced availability of higher quality information on product features (higher reliability, fresher, more uniform, broader diffusion). Increased ability to unbundle/rebundle product and service offerings.	Easier catalog updates allow for creation of new offerings based on component modules. Uniform cross-referencing for comparison of different product lines across partners. Catalogs more universally accessible allowing increased support for customer interactivity.

Step #5: Agreeing on and Disseminating the PIP Specification Agreement among enterprise partners on the PIP specification is reached, and the specification is shared and disseminated among supply chain partners.

This is a very important step in the e-business PIP design process as it is the precursor to preparation for PIP implementation and deployment. It includes validation of the PIP by others in the different partner enterprises who did not participate in the design. This category includes subject-matter experts around the supply chain process as well as managers who need to promote the use of the PIP. In a large industrywide project like RosettaNet, the validation and agreement requires formal voting among the consortium partners. In a smaller group of partners, validation and agreement can be informal. The PIP specification document needs to be disseminated to all who will implement the process and should be shared with all partners. Some software products allow the PIP models and business properties to be published directly on the Web, if they are open PIPs. The PIP output from the Workflow BPR software is viewable on the Web through a standard Web browser. Publishing PIP specifications and making them publicly available will become increasingly important as enterprises realize that they have to make themselves very easy to do business with electronically in order to gain collaborative advantage.

IT INTEGRATION OPTIONS FOR e-BUSINESS PROCESSES

8-1 PLANNING PROCESS INTEGRATION: PREAMBLE TO IMPLEMENTATION

8-2 THE EVOLVING SPECTRUM OF IT PLATFORMS FOR PROCESS INTEGRATION

8-2-1 Custom Application Development

8-2-2 Workflow Engines

8-2-3 Enterprise Application Integration

8-2-4 Specialized e-Process Automation Software

8-2-5 XML-based Process Integration Suites for e-Business

8-3 KEEPING BPR IN PERSPECTIVE: THE CHALLENGE OF ORGANIZATIONAL TRANSFORMATION FOR e-BUSINESS

WHAT CHAPTER 8 IS ABOUT

This chapter examines the different options for IT software platforms through which the new business process will be integrated into the enterprise IT architecture. This examination of alternative IT integration options is labeled as planning process integration (see Table 8-1). It is the third and last phase of business process redesign with BPR software before launching implementation and organizational transformation.

The chapter describes the evolving spectrum of IT software platforms for process integration in e-business contexts. As e-business increasingly shifts the focus from the enterprise to the supply chain level, a new class of software application architecture is emerging based on process management middleware. The chapter describes this new approach to business-to-business electronic commerce

that centers around process management and XML. XML is a new document and data formatting language used to execute business processes in e-business.

The chapter and the book end with a reminder on keeping BPR in-the-BIG in perspective. It reiterates how the focus of this book fits into the broader perspective of organizational transformation for e-business and ongoing process management. It also outlines the additional challenges of scope, scale, and speed that come with organizational transformation to e-business.

8-1 PLANNING PROCESS INTEGRATION: PREAMBLE TO IMPLEMENTATION

With the modeling, analysis, and redesign phases completed, the to-be business process is ready to be integrated into the organizational infrastructure (see Figure 8-1 and Table 8-1). The software process model is completed, alternative designs have been evaluated from a process performance perspective, and process impact reports have been generated. Alternative information technologies through which the to-be business process will be enabled have been considered in the redesign phase. However, there is also a need to examine the IT software platforms through which the new process will be integrated into the enterprise architecture before launching the implementation and organizational transformation. This examination of alternative IT integration options is labeled as planning process integration (see Table 8-1).

A preliminary process integration plan is prepared in this phase as part of the BPR process design and impact report documentation and analysis for the implementation team. It outlines the IT integration options for the new business process, which can then be further investigated by the implementation team. The plan also may suggest adjustments to process design to suit the realities of existing software platforms. However, it

FIGURE 8-1 Phases of business process redesign with BPR software

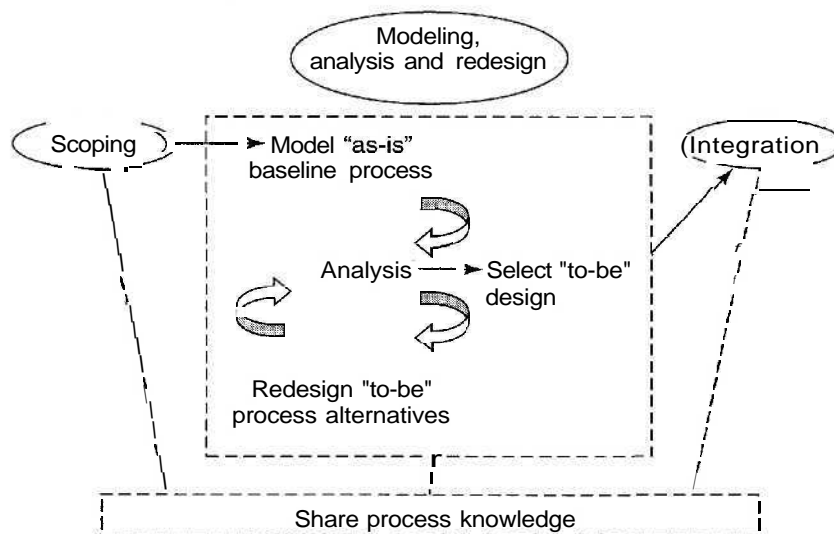


TABLE 8-1 KEY PHASES AND ACTIVITIES IN BUSINESS PROCESS REDESIGN WITH BPR SOFTWARE

Phase 1 Scoping the process	Phase 2 Modeling, analysis, and redesign of process	Phase 3 Planning process integration
Activities		
<ul style="list-style-type: none"> • Operationalize process performance targets • Define process boundaries • Identify key process issues • Understand best practices and define initial visions • Outline data collection plan and collect baseline data • Plan for modeling phase 	<ul style="list-style-type: none"> • Continue data collection • Model As-Is baseline process • Analyze and diagnose As-Is process • Design and model To-Be process alternatives • Analyze To-Be process alternatives and select best alternative • Plan process integration phase 	<ul style="list-style-type: none"> • Examine alternative IT integration options • Adjust process design • Plan for process implementation
Deliverables		
<ul style="list-style-type: none"> • Process scoping report 	<ul style="list-style-type: none"> • Software-based process model • Partner impact report • Process reengineering report 	<ul style="list-style-type: none"> • Process integration plan
Key participants		
<ul style="list-style-type: none"> • Process owners and partners • Customers of process • BPR team 	<ul style="list-style-type: none"> • Process participants • BPR team 	<ul style="list-style-type: none"> • IS design team • BPR team

is important to point out that it precedes the actual IT integration activity and information systems design activities. This chapter only describes the various IT integration options so that they can be planned for.

In a well-managed business process redesign initiative, the IT infrastructure and information systems design people are involved as early as the process scoping phase to help examine the fit of the process implementation with IT infrastructure. They should also be involved in this planning of the process integration phase. In the case of e-business, there is also a need for multiple enterprise partners to get involved as well as for IT solution providers to help integrate the disparate IT infrastructures that a supply chain process has to pass through.

IT architectures for e-business processes are fairly complex because they include the linkages between multiple enterprises that have heterogeneous IT infrastructures that

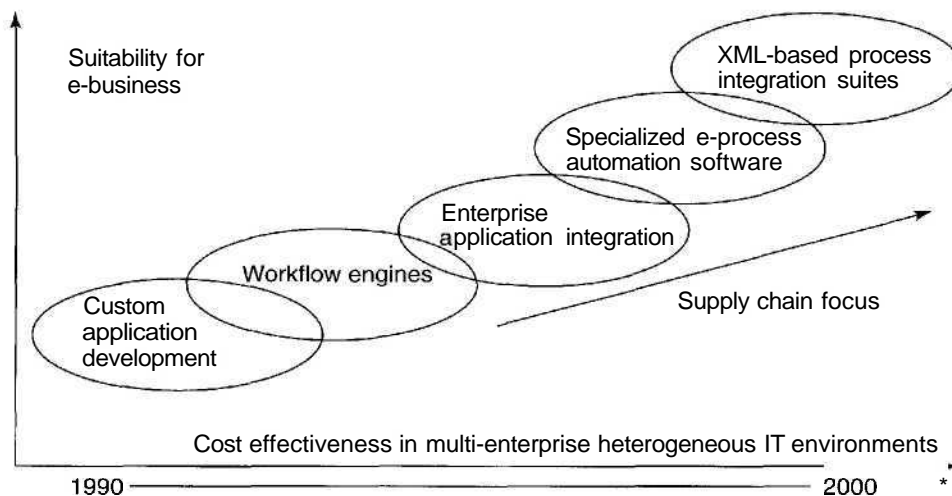
are not always compatible, whether at the technology or business process execution level. The details of those possible architectural options could be the topic of an entire book and is beyond the scope of this one. In the next section, however, we present a brief description of the types of IT integration platforms that are possible and how they are evolving for e-business.

8-2 THE EVOLVING SPECTRUM OF IT PLATFORMS FOR PROCESS INTEGRATION

A number of trends and pressures have influenced the evolution and development of IT software platforms for process integration in the last decade. First, the desire for high-speed and low-cost process execution that can scale up for business processes that are highly repeatable has triggered the development of workflow software that automates processes on execution. Since the early 1990s there has been an increased push toward trying to increase the extent of process automation by trying to encode business rules and routing for the process into the software. However, the focus of such workflow software was mainly on departmental and internal enterprise processes. In the mid-1990s there was an increased use of large-scale enterprise resource planning systems (ERP) from software vendors such as Baan, J. D. Edwards, Oracle, PeopleSoft, and SAP. This created a way and a demand for integrating business processes into IT architectures through these standard application software packages. However, supply chain partners often had ERP systems from different vendors, and that generated the need for enterprise application integration software to execute business processes that traversed through heterogeneous ERP environments.

In the late 1990s, when e-business started taking off, there was a push toward Web-enabled process integration platforms that could execute a process through the Internet across multiple enterprises while linking to heterogeneous software packages. This

FIGURE 8-2 The evolution of IT platforms for process integration 1990–2000



push started as specialized process automation software focusing on niche areas; it is blossoming into general-purpose process integration suites based on application connectivity through a new standard document formatting standard called XML. These process integration suites provide Web-based middleware across multiple enterprises with a sophisticated set of security features and process monitoring capabilities. Figure 8-2 shows this progression from the period 1990-2000. Over time there has been a steady increase in the ability of these IT platforms to enable process execution across a supply chain through multiple enterprises and across heterogeneous IT architectures. The platforms have become almost exclusively Web based and the increased plug-and-play capability is making them much more cost effective. We briefly explore the spectrum of this progression and then elaborate on the capabilities of the new generation of XML-based process integration middleware suites for e-business.

8-2-1 Custom Application Development

It's possible to integrate new processes into enterprise IT architectures through customized application development. Enterprises can develop their own piece of application software that can be used to execute the new business process. For example, enterprises that do not have standard ERP application packages may want to link to their own application architecture. They may need to build their own links between the new process application software and the existing IT architecture.

Customization is still common in application integration in general. In a 1999 survey of 150 IT managers by *Information Week*, fewer than 40 percent used commercial application servers or prepackaged middleware to link their front-end and back-end applications. Over 70 percent said they used custom solutions developed in-house for integrating disparate applications, while over 50 percent said they used custom solutions developed through vendors. Such customization is possible and may make good business sense in environments where there are nonstandard legacy applications that are difficult to replace. However, custom application development is typically slower, costlier, and riskier than the use of standard off-the-shelf software.

8-2-2 Workflow Engines

Business processes can be executed semiautomatically through workflow application software that is run through a workflow management software "engine." The workflow management engine instantiates the business process and ensures that data and documents are routed to the right employee based on business rules so that employees can perform the work. The workflow application software will also track where each instance is in the process and keep various process execution statistics. Various degrees of automation are possible through workflow software. For example, the workflow application software can act passively by providing a work list so users can pick and choose a task, or the workflow application software can actively instantiate the task for the selected employee without prompting. The workflow application software maintains all the business process information regarding routing, databases used, activities performed, employee authorization levels, sequence of activities, and business rules for branching

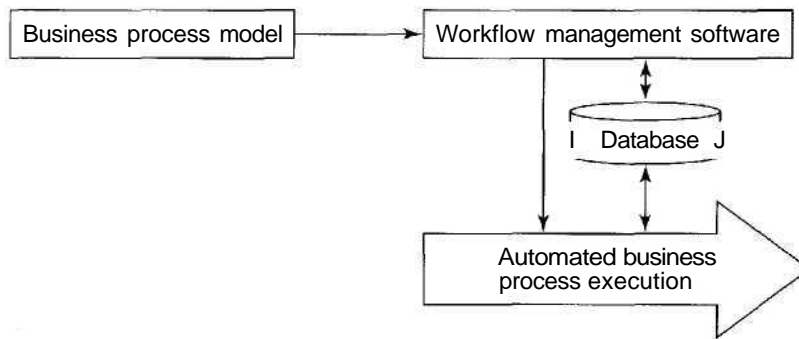


FIGURE 8-3 The operation of a workflow engine

the process flow. In the example of Paloma Bank in Chapter 4, a workflow engine solution was well suited for process integration in that environment (See Section 4-4 in Chapter 4). Business process modeling software such as the *Workflow·BPR* software included with this book can be used to output a software process model that can be input directly into workflow application software. For example, the *Workflow·BPR* software process models can be exported directly into common workflow application software: IBM's *Flowmark* and *MQ Series* products, *FileNet's Visual WorkFlo* product, and *Shared Network System's Open Image* product. To prepare a software process model for export into a workflow application such as IBM's *MQ Series* from *Workflow·BPR*, a different Editing mode needs to be selected through the Editing Menu so that translation can occur into the modeling conventions and parameters that the IBM *MQ Series* software is familiar with. Thus the process model can be integrated directly into workflow applications without having to rebuild it from scratch. Furthermore, when it is a re-designed to-be process, it is already optimized for execution.

3-2-3 Enterprise Application Integration

Many business processes are integrated into enterprise architectures through standardized enterprise resource planning (ERP) software packages that support process flows spanning several functions such as finance, manufacturing, sales, and human resources. The leading ERP packages at this writing are from Baan, J. D. Edwards, Oracle, PeopleSoft and SAP. Similarly, some business processes are integrated into enterprise architectures through customer relationship management (CRM) enterprise software that focuses on front-office processes such as customer contact and sales. The leading CRM enterprise package at this writing is from Siebel Systems. Very often these monolithic enterprise packages are supplemented by special-purpose modules for specific processes.

These ERP and CRM packages are very good at integrating an enterprise's internal business processes; however, they are not as well geared to cross-enterprise integration, especially when enterprises use ERP or CRM packages from different vendors. Furthermore, there is often a need to integrate across different enterprise application boundaries. This gave rise to a new breed of business integration software that focuses

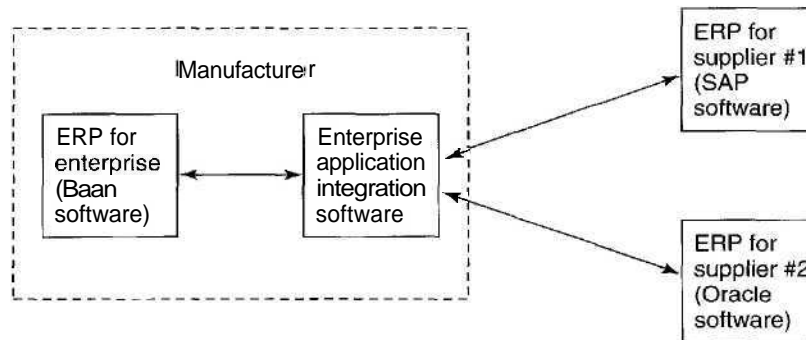


FIGURE 8-4 Enterprise application integration software

on enterprise application integration across enterprises and disparate software packages. Examples of software vendors in this growing business-to-business integration market are Active and Vitria. Business-to-business integration software provides a means for companies to automate shared business interactions and manage a growing diversity of organizations and their respective enterprise systems, no matter how disparate. An example is shown in Figure 8-4. The enterprise application integration software manages the process flow and interactions across supply chain partners' disparate ERP systems and becomes part of the process flow architecture. In the example of Zyco Insurance in Chapter 6, an enterprise application integration solution is also well suited for process integration in that environment. It could enable the business process to be executed across both back-office and front-office infrastructures and link disparate enterprise application software (See Section 6-1-4 in Chapter 6).

8-2-4 Specialized e-Process Automation Software

While conventional workflow application software is typically geared to enterprise processes rather than to supply chain processes, it is evolving such that it can be used to automatically execute processes over the Internet (e-processes) across enterprises. A whole new class of e-process automation software is emerging that is focused in depth on processes around niche areas (see Figure 8-5). For example, Ariba has built process integration software for the purchasing process in the area of operating resources (such as office supplies). The Ariba operating resource management software platform is accessible through a corporate intranet and uses a Web browser front end. It includes process automation as well as links to the Web-enabled databases and product catalogs of preferred suppliers through a catalog server. It routes electronic forms automatically, requests approvals based on business rules, links to product catalogs of suppliers through the Web, allows employees to order supplies directly online, and keeps track of payments. The integration provides employee connectivity through the Web, back-end connectivity to the enterprise's purchasing processes, and supplier connectivity through Ariba's catalog server. These special-purpose integration solutions work well in their niche environments.

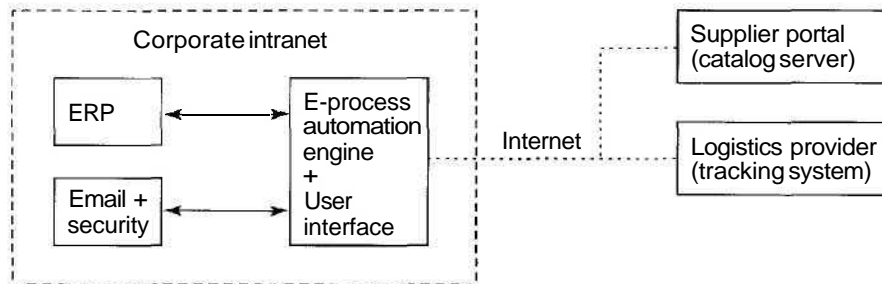


FIGURE 8-5 Specialized e-process automation software

8-2-5 XML-Based Process Integration Suites for e-Business

With the business-to-business electronic commerce boom in 1999, it became increasingly apparent that there was a need for off-the-shelf general-purpose process integration platforms that could electronically execute supply chain processes through the Internet across multiple enterprises while linking to heterogeneous software packages. There was also a need for more sophisticated functionality in terms of process monitoring, security, and exception handling. A new document formatting language (XML) provided the vehicle to make plug-and-play seamless connectivity between the processes of various enterprises a reality.

XML (Extensible Markup Language) is a new document and data formatting language that makes the information on a structured document self-describing when it is passed from one computer to another through the Internet. XML was completed in 1998 by the World Wide Web Consortium and is an open standard that is freely available.

HTML (Hypertext Markup Language) is the main formatting language for the Web. HTML is an electronic publishing language that is able to tell a Web browser how a page looks and how text, images, and buttons are arranged on the Web page. The "markup" idea comes from the publishing business in which marks were scribbled as notes on manuscripts to instruct typesetters on formatting (new page, graphic, for example). HTML is very successful for sending formatted documents on request, but it was not designed to transmit transactions that are part of an e-business process (such as processing a customer order) so that they can be pasted directly into a transaction database (such as an order management database) and further manipulated. The database would not know what to make of the information on an HTML document (such as identifying price and quantity of items in a customer order).

XML solves that problem by using embedded "tags" with identifying codes that describe what the information is in a particular part of the document (such as price, quantity, color, address, zip code). Thus XML marks up a document with user-defined tags that describe the document's content and leaves presentation to be taken care of separately. This way a computer can recognize the document as a particular type of transaction (such as a customer order) and automatically process it through various computer-based applications (such as the order management system) without any human intervention. At the same time XML is simple enough that the data is organized in human-readable form and lends itself to common text editors for viewing and editing.

We include an example of XML code syntax for a purchase order. The angle brackets are used to define the custom tags. A computer program (application) can locate a particular attribute (such as postal code) and extract its value regardless of the order in which it appears in the XML document. It is very easy to add new attributes to the XML document (such as item weight, for example) that support the requirements of another computer application (such as shipping) without affecting the original application that used the document. Customization across different enterprises and applications becomes much simpler and faster.

```

XML Syntax for a Purchase Order
<PurchaseOrderHeader>
  PurchaseOrderNumber>65123/PurchaseOrderNumber>
  / <PurchaseOrderDate>20001205</PurchaseOrderDate>
</PurchaseOrderHeader>
<PurchaseOrderDetail>
  <Name>
    <EntityIdentifierCode Code="BY Buying Party"/>
    <EntityName>General Hospital</EntityName>
    <IdentificationCode>HHS6547</IdentificationCode>
  </Name>
  <Name>
    <EntityIdentifierCode Code="ST Ship To"/>
    <EntityName>General Hospital</EntityName>
  </Name>
  <AddressInformation>7001 Caruso Street</AddressInformation>
  <GeographicLocation>
    <CityName>Los Angeles</CityName>
    <StateProvinceCode>CA</StateProvinceCode>
    <PostalCode>90089</PostalCode>
    <CountryCode>USA</CountryCode>
  </GeographicLocation>
  <ItemData>
    <QuantityOrdered>25</QuantityOrdered>
    <Unit Code="EA Each"/>
    <UnitPrice>18.45</UnitPrice>
    <PriceBasis Code="WE Wholesale Dollar Price per Each"/>
    <ProductID Description="Digital Thermometer">DT546</ProductID>
  </ItemData>
</PurchaseOrderDetail>
</PurchaseOrder>

```

XML is able to bridge the incompatibilities of different computer systems through a common language that enables structured data exchange and search. Data can be output in XML and input into XML-aware applications. Thus one application need not understand the other application's format; XML provides a bridge between formats.

Another advantage of XML is that it provides the ability for applications to manipulate data locally rather than just formatting and presenting the data. Furthermore, any character in any language is legal within an XML document. Thus XML supports the intermingling of text in all of the major written languages in the world, making it very attractive for global e-business that involves countries with different languages. XML will also facilitate and greatly speed up information searches on the Web as more industry-specific XML tags are devised and increasingly used to identify information on the Internet. It is for all these reasons that XML is becoming so popular for e-business applications.

The beauty of XML for executing business processes is that XML documents passed between the computer systems of two enterprises doing e-business with each other can trigger different process sequences, depending on the contents and how they are tagged. It is thus possible to embed business rules within an XML document. For example, an enterprise could specify that purchase orders over \$10,000 need to be routed to a vice president for approval and embed that process logic within an XML document. This scheme provides an attractive vehicle for process integration. The RosettaNet Consortium mentioned in Chapter 7 is implementing its Partner Interface Process (PIP) specifications in XML.

XML has many advantages over traditional EDI (Electronic Data Interchange). EDI is used by many large enterprises to transmit transactional structured documents within a supply chain process to its trading partners. EDI also automates structured document exchange between different computer applications, but uses fixed document standards and mappings rather than customized extensible markup tags like XML. The limitations and inflexibility of traditional EDI standards has made it successful for only a narrow segment of supply chain activities—namely, order processing, drop shipment, and payment. EDI standards (whether the ANSI X.12 or EDIFACT standard) are inflexible and limited. Individual enterprises cannot add new transactions, modify existing ones, or add more information to existing EDI documents. Furthermore, EDI implementation has been expensive and technically demanding and often beyond the reach of small and medium-size companies. It has often required the services of an intermediary VAN (value-added network) to provide technical and infrastructural services and support at considerable expense. In contrast, XML is inexpensive to set up and customize and is natively Internet-based. Most importantly, EDI merely presents information or data, whereas XML describes the data and then defines the data's structure, allowing the information to be interpreted. Thus it is easily possible to define business rules, activities, and exceptions through an XML workflow between two enterprises; this is not the case with a standard EDI document. There is a new incarnation of extensible EDI being developed that is based on XML and also Internet-based. Standards are being established by the XML/EDI group. Eventually it appears that traditional EDI will be reincarnated in a Web-based XML envelope.

XML References

- Jon Bosak, and Tim Bray. "XML and the Second-Generation Web," *Scientific American*, May 1999, 89-93.

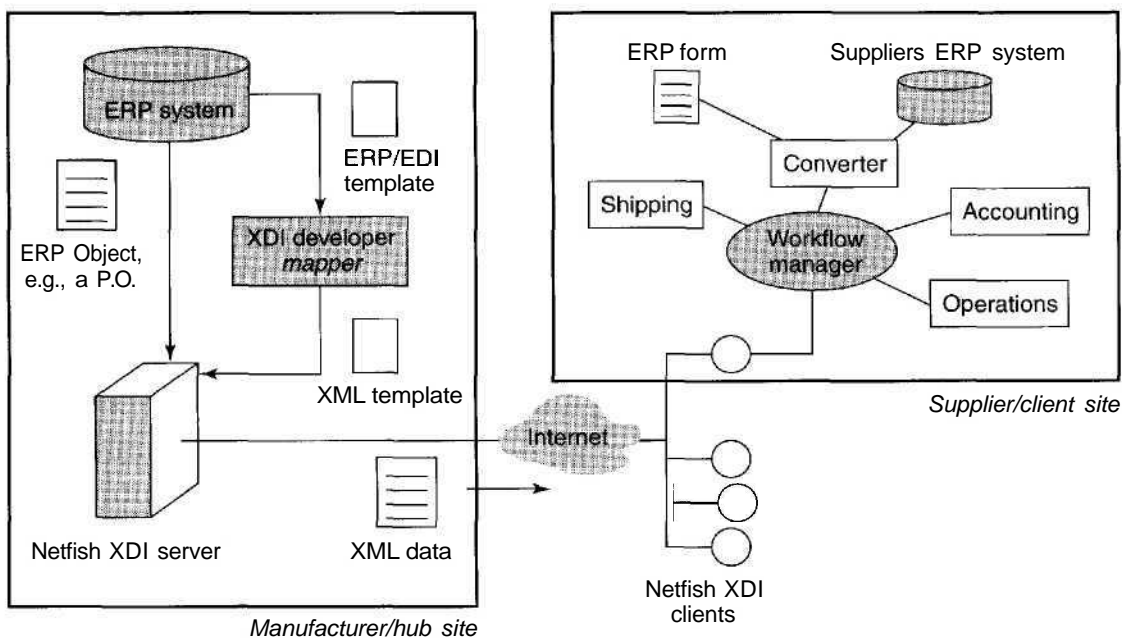
- Neil Gross, and Michael Moeller. "A Rosetta Stone for the Web?" *Business Week*, June 14, 1999, 98-100.
- Don Kiely "XML: More than Just a Quick Fix," *Information Week*, Feb. 8, 1999, 77-82.
- <http://www.xml.org>

With the emergence of XML, it became feasible to devise process integration platforms for e-business with general purpose applicability and quick implementation. This was the new glue or middleware for e-business process integration within and across enterprises. In 1999 a number of XML-based process integration software platforms appeared from vendors such as Extricity, Netfish Technologies, Vitria, and WebMethods. Increasingly they were being developed into full-fledged suites with capabilities for routing requests, managing tasks, and mapping translations as well as handling performance monitoring and security measures. For illustration, we examine the basic architecture and capabilities of one of these platforms from Netfish Technologies (www.netfish.com).

The Netfish XDI process integration platform for e-business is based on XML-based data interchange (XDI). It is designed to electronically execute supply chain business processes across multiple trading partners over the Internet and across heterogeneous applications. The operation of the Netfish XDI system is schematically shown in Figure 8-6. The XDI server is the core of the XDI system, together with an XDI client and an XDI Developer suite.

FIGURE 8-6 The Netfish XDI process integration platform for e-business

(figure from "Integrating Business Processes and Collaborative Workflows with XML" Aberdeen Group, Executive White Paper, November 1999)



- **XDI Server:** The XDI server resides in the enterprise (say a high-volume manufacturer) and becomes the process integration hub site. The XDI server is the document repository for both incoming and outgoing transaction documents. It interfaces directly with back-office systems in the enterprise. It has search, audit, reporting, and archiving capability as well as authentication, encryption, and other security services. Furthermore, it includes a workflow engine that enables a configurable sequence of activities to be automatically executed on inbound documents.

- **XDI Client:** The XDI clients are scaled-down versions of the XDI server that enable trading partners (suppliers or customers) to have their processes communicate electronically with those of the manufacturing hub. The XDI client manages all document transactions at supplier or customer together in conjunction with the XDI server at the manufacturer. Different process sequences can be triggered based on business rules embedded in the XML document. A converter can extract or insert data back into ERP back-office systems. If the application is XML-aware and interfaces according to agreed-upon standards (such as the RosettaNet PIP standards explained in Chapter 7), then the XDI server can work without the need for an XDI client.

- **XDI Developer:** The XDI developer suite provides the integration tools that convert business transactional data from enterprise applications (such as ERP) into structured XML documents (say a purchase order or engineering change order). It includes "adapters" that extract and import/export XML data into back-end enterprise systems. It also includes "converters" that automatically translate EDI, ERP, database, and Web forms into XML documents. It comprises a "mapper" that can be used to create XML templates based on existing EDI documents; for example, capabilities for defining business rules, validation criteria, and cross-referencing. Furthermore, it incorporates a forms designer that can define custom form interfaces for various trading partners from XML input.

Let us illustrate how the XDI process integration platform works through Figure 8-6 and an order management process example. The XDI server is at the manufacturer, which is the hub site. Let us take a scenario in which the ERP system (say SAP) at the manufacturer detects low inventory and automatically triggers a purchase order. The XDI server automatically translates the purchase order from the ERP system format into XML. It puts the XML document in the mailbox of the trading partner (the supplier in this case) on the XDI server. It schedules the document for delivery to the supplier and applies any requisite encryption. The XDI server keeps a log of all transactions that flow through it. The XML purchase order is routed through the Internet to the supplier's XDI client. The workflow engine interprets the business rules on the XML purchase order and automatically routes it to shipping, accounting, and operations. These supplier processes are now automatically synchronized with the manufacturer's process. The ERP adapter at the supplier site transforms the data to ERP specifications and writes the data to the back-office ERP system. The converter at the supplier site can also generate an EDI document for one of its component suppliers who still uses EDI. This process execution happens automatically with no human intervention.

The use of such process integration suites removes many of the coordination misalignments that plague supply chains when they are not synchronized. The electronic

and automatic seamless execution of business processes through XML and across multiple enterprises and noncompatible back-office applications is making effective process management for e-business a reality. These process integration developments and platforms make possible the transition from business process redesign to full-fledged business process management as we enter the 21st century.

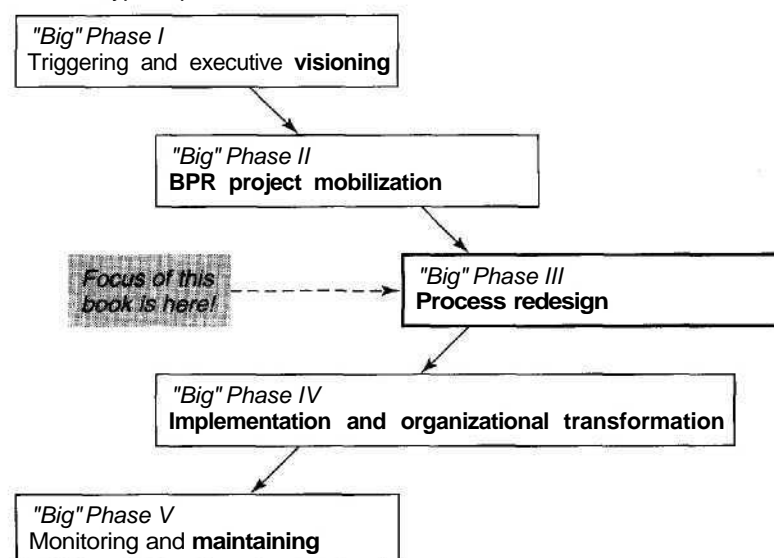
8-3 KEEPING BPR IN PERSPECTIVE: THE CHALLENGE OF ORGANIZATIONAL TRANSFORMATION FOR e-BUSINESS

The IT integration phase is the third and last phase of business process redesign with BPR software (see Figure 8-1) that has been the focus of this book. However, the process redesign phase is only one of five phases of BPR in-the-BIG as explained in Chapter 1 and shown below in Figure 8-7.

The phase that comes after process redesign is the implementation and organizational transformation phase. While it is not the focus of this book, it is important to note that the organizational transformation stage is the most challenging and tough phase to execute. It includes designing the information systems and modifying the IT infrastructure. It also includes instituting the new business processes with their accompanying organizational changes, **reskilling** and reassigning people, and dealing with all the human issues associated with organizational change. Like any other organizational transformation effort it requires good management, champions and motivators, effective communication, and constant evaluation—as well as executive support. All the common wisdom of how to manage organizational change applies to BPR.

There are some additional challenges, however, in the case of e-business when a traditional brick-and-mortar company wants to make the transformation. First, there is the

FIGURE 8-7 The five typical phases of BPR in-the-BIG



challenge of scale. Organizational transformation to e-business is typically a huge undertaking for an enterprise as many business processes throughout the enterprise have to be simultaneously restructured to go online. The extent of investment in IT infrastructure change is major, the new skills needed to operate in such a technology-intensive environment are many, and the extent of organizational restructuring is typically very large.

Second, there is the *challenge of scope*. It is not only the enterprise processes that are being redesigned for online business but also the many supply chains that the enterprise participates in. This requires coordination and collaboration with many other enterprises in order to enable an effective organizational transformation to e-business. Furthermore, not only are the processes jointly carried out with partners being redesigned, often the entire business model through which an enterprise or its supply chain operates is being changed. New revenue models (such as auctions, referrals, dynamic pricing) and new organizing models (such as portals and service hubs) are often at the heart of business process changes.

Third, there is the *challenge of speed*. Competitors in e-business move in "Internet time" at unprecedented speeds. A traditional brick-and-mortar enterprise must compete with new online enterprises that appeared because of the Internet. These new online enterprises move very quickly and are unencumbered by the legacy of the past. This puts enormous time pressure on organizational transformation to e-business.

In combination, these challenges of scale, scope, and speed add to the demands of organizational transformation that accompany BPR for e-business. Some traditional enterprises have found the magnitude of the organizational transformation to be so extensive that they have opted to spin off new dot-corn companies that operate separately and have very different business processes and organizational design. Others have acquired dot-corn companies and tried to integrate them with their existing operations. Whatever the strategy, there is no doubt that the organizational transformation stage of BPR for e-business is the most difficult phase to execute.

The final stage of BPR in-the-BIG is monitoring and maintaining. When conditions change and opportunities arise, business processes need to be reevaluated and possibly redesigned. In the case of e-business, this is likely to occur very often due to competitive pressures and technological change. Thus the entire BPR in-the-BIG cycle iterates again and again in a continuous improvement mode. With the use of software tools for process redesign such as the one used in this book, it becomes much easier to go back and modify designs quickly and robustly. Software-based process designs are both a knowledge repository of process expertise as well as a platform for continuous process improvement. At the speed of business change that the 21st century promises to bring, it will become imperative to use these tools and methods for BPR as they become a perpetual front end for process management across e-business enterprises.

INSTALLING THE HOLOSOFX WORKFLOW-BPR MODELER SOFTWARE

© THINGS YOU NEED TO KNOW

To work with **Workflow-BPR**, a basic knowledge of Microsoft Windows is required. You should be familiar with mouse techniques such as pointing, clicking, double-clicking, dragging, choosing menu commands, and selecting dialog options. In addition, it is necessary to know how to use Windows Explorer. If you are unfamiliar with any of these terms or techniques, refer to Microsoft Windows documentation for instructions.

⚠️ NOTE ABOUT THE ACADEMIC VERSION OF THE WORKFLOW-BPR SOFTWARE

The version of the WorkflowBPR software that comes with the BPR workbook is an academic version of the software with the functionality of the professional version but it has limitations. The software expires after 120 days of use, and can only be opened 120 times. Exporting process models to workflow software is also disabled. Holosofx also will not provide direct technical support for this version. Readers wishing to purchase the professional version should contact Holosofx directly at www.Holosofx.com or call 1-310-640-0101 in the USA.













💻 WHAT KIND OF PC WILL YOU NEED?

WorkflowBPR runs on a PC that has a 486 or higher microprocessor chip and runs Microsoft Windows 95, Windows 98, or Windows NT.

Memory and Disk space: The PC must have a minimum of 32 MB of memory and a hard disk with 60 megabytes of free space.

CD-ROM: You will also need a CD-ROM drive to install the WorkflowBPR software that comes on the CD-ROM in the jacket at the back of this workbook.

HOW TO INSTALL THE WORKFLOW-BPR MODELER SOFTWARE

1. Disable any virus protection programs.
2. If this is not your first Workflow-BPR installation, then backup your working Workflow-BPR files outside the WorkflowBPR installation folder, uninstall your earlier version of WorkflowBPR.
3. Insert the **WorkflowBPR** CD into your CD Rom drive.
4. From the Windows **Task Bar**,  choose **Start > Run**.
5. In the **Open** text box,  type **X:\Setup** (X is the CD ROM drive letter).
6.  Click **OK** or  press **Enter**. The **WorkflowBPR Directory** dialog box appears.
7. If you want to install into a folder other than **C:\Wfbpr**, which is the default installation folder, then click the **Browse** button to open the **Choose Folder** dialog box. Close the **Choose Folder** dialog box when done.
8.  Click **Next >** or  press **Enter**. The **Setup Type** dialog box appears.
9.  Select **Standard** (the default), and  click **Next >** or  press **Enter**. WorkflowBPR will be installed.
10. When the **Setup Complete** dialog box appears,  click **Finish** or  press **Enter** to exit the installation program.
11.  Choose **Start > Programs > Workflow BPR > WFBPR 3.4.3 (Academic)** to run the installed program.

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