CHAPTER 8

Business Process Management: Creating an Adaptable Organization

Joseph A. De Feo

About This Chapter

Success in achieving superior results depends heavily on managing such large, complex, multifunctional business processes, as product development, the revenue cycle, invoicing, patient care, purchasing, materials procurement, supply chain, and distribution, among others. In the absence of management's attention over time, many processes may become too slow, obsolete, overextended, redundant, excessively costly, ill defined, and not adaptable to the demands of a constantly changing environment. For processes that have suffered this neglect (and this includes many processes for reasons that will be discussed later in this chapter) quality of output falls far short of the quality required for competitive performance. This chapter focuses on helping an organization maintain its sustainability and adaptability by ensuring proper day-to-day ownership of important business processes. Business process ownership happens after an organization masters all processes of the Juran Trilogy.

High Points of This Chapter

1. Creating a sustainable and adaptable organization requires that all key business processes are managed on a day-to-day basis. This occurs when an organization has fully deployed its vision and mission.
2. Strategic goals tied to the organization vision, which are shared by executive leadership and deployed throughout the organization in the form of key business objectives are commonplace.
3. Multifunctional, full-time business process teams, owned and supported by the management system (education, communication, performance management, recognition and reward, compensation, and new career path structures) are identified.
4. The charter of each team is to continuously and dramatically improve the effectiveness and efficiency of each major business process to which it is assigned on an ongoing, daily managed basis.
5. Process owners are empowered and held accountable to act in support of these key business objectives.
6. Skills in performance excellence methods and project management to enable many of its schedules, costs, and work plans being coordinated and implemented throughout the organization is required.
7. Executive management promotion of the importance, impact, progress, and success of the Business Process Management (BPM) effort throughout the organization and to external stakeholders is a prerequisite.
8. Organization leaders who have adopted BPM as a management tool know that process management is a continuous managerial focus, not a single event or a quick fix. They also know that a constant focus on business processes is essential to the long-term success of their organization.

Why Business Process Management?

The dynamic environment in which business is conducted today is characterized by what has been referred to as "the six Cs": *change, complexity, customer demands, competitive pressure, cost impacts, and constraints.* All have a great impact on an organization's ability to meet its stated business goals and objectives. Organizations have responded to these factors by developing new products and services. They also have carried out numerous "breakthrough projects" and are at a maturity level conducive to process ownership.

> A business process is the logical organization of people, materials, energy, equipment, and information into work activities designed to produce a required end result (product or service) (Pall 1986).

There are three principal dimensions for measuring process performance: effectiveness, efficiency, and adaptability:

1. The process is *effective* if the output meets customer needs. It is *efficient* when it is effective at the least cost.
2. The process is *adaptable* when it remains effective and efficient in the face of the many changes that occur over time.

On the surface, the need to maintain high-quality processes would seem obvious. To understand why good process quality is the exception and not the rule requires us to look closely at how processes are designed and what happens to them over time.

BPM has become a critical component of information technology (IT) programs. Without having good business process management system, an IT system can fail. All disciplined IT implementations must include well-developed BPM processes. With technology, BPM allows organizations to abstract business processes from the technology infrastructure and go far beyond automating business processes or solving business problems. BPM enables business to respond to changing consumer, market, and regulatory demands faster than competitors, creating a competitive advantage. In the IT world, BPM is often called a BPM life cycle.

For reasons of history, the business organization model has evolved into a hierarchy of functionally specialized departments. Management direction, goals, and measurements are deployed from the top downward through this vertical hierarchy. However, the processes that yield the products of work—in particular, products that customers buy (and that justify the existence of the organization)—flow horizontally across the organization through functional departments (Figure 8.1). Traditionally, each functional piece of a process is the responsibility of a department, whose manager is held accountable for the performance of that piece. However, no one is accountable for the entire process. Many problems arise from the conflict between the demands of the departments and the demands of the overall major processes.

In a competition with functional goals, functional resources, and functional careers, cross-functional processes are starved for attention. As a result, the processes as operated are often neither effective nor efficient, and they are certainly not adaptable.

A second source of poor process performance is the natural deterioration to which all processes are subject in the course of their evolution. For example, at one railroad, the company telephone directory revealed that there were more employees with the title "rework clerk" than with the title "clerk." Each of the rework clerks had been put in place to guard against the recurrence of some serious problem that arose. Over time, the imbalance in titles was the outward evidence of processes that had established rework as the organization's norm.

The rapidity of technological evolution, in combination with rising customer expectations, has created global competitive pressures on costs and quality. These pressures

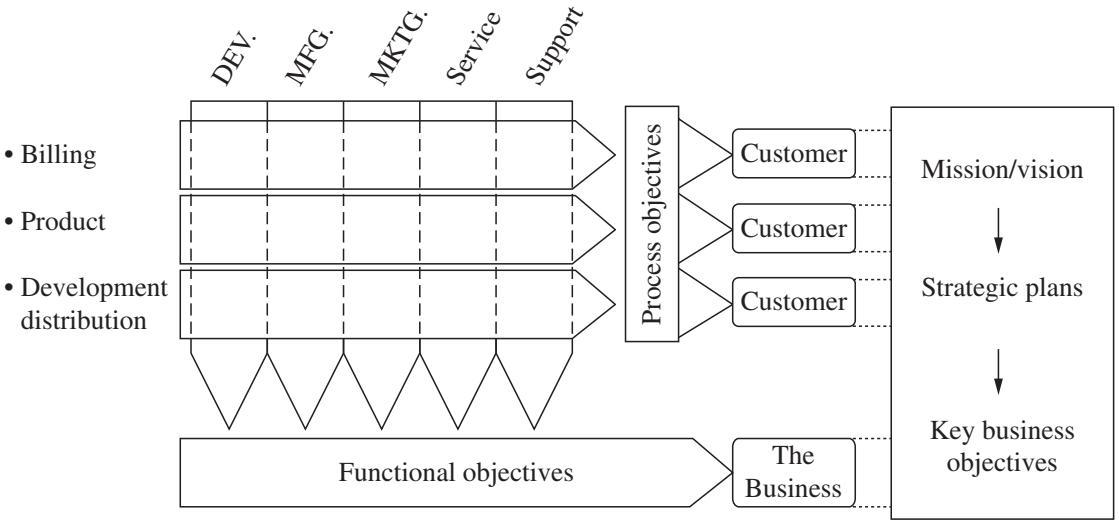

Figure 8.1 Horizontal flow through functional departments.

have stimulated an exploration of cross-functional processes—to identify and understand them and to improve their performance. There is now much evidence that, within the total product cycle, a major problem of poor process performance lies with BPM technologies. Functional objectives frequently conflict with customer needs, served as they must be by cross-functional processes. Furthermore, the processes generate a variety of waste (e.g., missed deadlines, factory scrap). It is not difficult to identify such products—generating invoices, preparing insurance policies, or paying a claim—that take over 20 days to accomplish in less than 20 minutes of actual work. Processes are also not easily changed in response to the continuously changing environment. To better serve customer needs, there is a need to restore these processes to effectiveness, efficiency, and adaptability.

The Origins of BPM

The IBM Corporation was among the first American companies to see the benefits of identifying and managing business processes. The spirit of IBM's first efforts in managing these processes in the early 1980s was expressed as follows: "Focus for improvement must be on the job process" (Kane 1986). BPM has long been practiced in the manufacturing arena. In product manufacturing, the plant manager "owns" a large part of the manufacturing process. This manager has complete responsibility for operating his or her part of the manufacturing process and is accountable for the results. As an owner, the manager is expected to control, improve, and optimize the manufacturing process to meet customer needs and business needs (e.g., cost, cycle time, waste elimination, and value creation). In pursuit of these targets, managers of the manufacturing process have developed some indispensable concepts and tools, including defining process requirements, documenting a step-by-step process, establishing process measurements, removing process defects, and ensuring process optimization. In fact, much of the science of industrial engineering is concerned with these tasks. Recognizing the value of these tools in manufacturing and their applicability to business processes, the IBM senior management committee directed that BPM methodology be applied to all major business processes (such as product development, business planning, distribution, billing, and market planning)—and not just to the manufacturing process.

Around the same time, other North American companies, including AT&T, Ford Motor Company, Motorola, Corning, and Hewlett-Packard, also began applying BPM concepts to their business processes. In all these companies, emphasis was placed on cross-functional and cross-organizational processes. Applying BPM methodology resulted in breaking down functional barriers within the processes. In each case, a new, permanent managerial structure was established for the targeted process.

By mid-1985, many organizations and industries were managing selected major business processes with the same attention commonly devoted to functions, departments, and other organizational entities. Early efforts bore such names as Business Process Management, Continuous Process Improvement, and Business Process Quality Improvement.

Michael Hammer (1990) raised the visibility of business processes to a level that created a frenzy with the introduction of BPR—Business Process Reengineering—in the early 1990s. In subsequent years, BPR has often been associated with drastic change and downsizing initiatives, rather than improving processes and resulted in many failed reengineering efforts.

The emergence of BPM in the new millennium, post-BPR, has resulted in renewed focus for the need to manage workflows and has been a solid, yet silent, business revolution. To

Organization Behaviors	Functional Organization	Process-Centric Organization
Managers manage:	Resources work	Customers and results
Teams produce:	Independently	Collaboratively
Organization dynamics and self-reorganization:	Rigid to adapt, frequent reorganization	Flexible to new demands
Resources focus:	Meeting job requirements	Best results, customers
Knowledge dissemination:	Islands of information	Integrated across the organization
Culture:	Closed	Open

Table 8.1 Functional vs. Process Organization

understand why an entire organization would evolve from process improvement to business process management and ownership, we must understand the primary characteristics of the business process and the benefits brought about by BPM. The traditional "functional organization" is a remnant of the Industrial Revolution in which the guiding principle for organizing by function is the distribution of work by labor specialization.

Functional organizations may not disappear completely but rather be transformed into the context for managing processes that bring value to customers. Technological superiority, innovation, or longevity are no longer what makes or breaks organizations—it is how well organizations are organized to respond to and serve their customers. As an organization learns how to manage across functions via project by project improvement, it moves toward BPM. BPM is a process to sustain the changes made from all those improvement projects.

The only way to achieve such sustainable customer satisfaction and results is to become an adaptable organization. To be adaptable means your organization can respond quickly to the changing needs of customers, technology, and innovation by competitors.

Table 8.1 highlights important cultural differences between a functional organization and a process-centric one.

BPR should be mentioned as part of this family of methodologies. Like the methodologies mentioned previously in this chapter, BPR accomplishes a shift of managerial orientation from function to process. According to the consultants who first described BPR and gave it its name, BPR departs from the other methodologies in emphasizing radical change of processes rather than on incremental change. Furthermore, BPR frequently seeks to change more than one process at a time. Because of the economic climate of the early 1990s, and the outstanding payback that some writers attribute to BPR, its popularity grew rapidly for a time.

However, there is evidence, including the testimony of Michael Hammer, one of the most widely published researchers on BPR, that in many early applications, the lure of rapid improvement caused some managers (and their consultants), who ignored human limitations, to impose too much change in too short a time, with a devastating effect on long-term organization performance. Furthermore, in many early applications, users became so fascinated by the promise of radical change that they changed everything, overlooking elements of the existing process design that worked perfectly well and would have been better carried over as part of the new design. Such a carryover would have saved time, reduced demand on the designers, and produced a better result.

BPM Defined

The methodology described here is one that has been introduced with increasing success by a number of prominent corporations, including the ones already mentioned. Although it may vary in name and details from organization to organization, methodology possesses a core of common features that distinguishes it from other approaches to managing quality. That core of features includes a conscious orientation toward customers and their needs, a specific focus on managing a few key cross-functional processes that most affect satisfaction of customer needs, a pattern of clear ownership—accountability for each key process, a cross-functional team responsible for operating the process, and application at the process level of quality-management processes—quality control, quality improvement, and quality planning. In this chapter, the methodology is referred to as process quality management, or BPM.

The BPM Methodology

BPM is initiated when executive management selects key processes, identifies owners and teams, and provides them with process goal statements. After the owners and the team are trained in performance excellence methods and tools, they work through the three phases of BPM methodology: planning, transfer, and operational management.

The *planning phase,* in which the process design (or redesign) takes place, and is the most time consuming of the three phases, involves five steps:

1. Defining the present process.
2. Determining customer needs and process flow.
3. Establishing process measurements.
4. Conducting analyses of measurement and other data.
5. Designing the new process. The output is the new process plan.

The *transfer phase* is the second phase, in which the plans developed in the first phase are handed off from the process team to the operating forces and put into operation.

The operational management phase is the third phase of BPM. Here, the working owner and team first monitor new process performance, focusing on process effectiveness and efficiency measurements. They apply quality control techniques, as appropriate, to maintain performance. They use quality improvement techniques to rid the process of chronic deficiencies. Finally, they conduct a periodic executive management review and assessment to ensure that the process continues to meet customer and business needs and remains competitive.

Note: BPM is not a one-time event; it is itself a continuous process carried out in real-time.

A Case Study: Unisys is a worldwide information technology services and solutions organization with a client base spread over 100 countries. The organization offers a rich portfolio of business solutions led by its expertise in systems integration, outsourcing, infrastructure services, server technology, and consulting. Unisys Global Infrastructure Services (GIS) provides value-added services needed by organizations to design, integrate, and manage their distributed IT infrastructures including desktop environments, servers, networks, and mobile/wireless systems. One of the key divisions in GIS is Infrastructure Managed Services (IMS), which

drives services-based solutions that enable Unisys clients' infrastructures to be managed and continuously improved for business value and cost management.

Defining a vision: the IMS division began to develop an organization-unique, process-based methodology named Unify. The goal was to introduce repeatability and consistency in the way clients are serviced around the world. Developing the methodology required IMS to map and document approximately 600 processes. IMS searched for a BPM solution with this in mind.

Using such technologies as Microsoft Visio add-on, and Designer (process simulation software) IMS creates complete models of its operational business processes. IMS began the task of implementing its BPM methodology. Within one year of the project start date, they capture and manage their key business processes, including organizations, resources and roles, and related information, and view them at various levels of detail. As a fully dynamic solution that is specifically designed for business users, BPM helped the division to identify optimal ways to increase organization efficiency, ensure that activities are done consistently, and reduce training requirements.

Another approach to BPM is based on five categories of BPM activities: design, modeling, execution, monitoring, and optimization.

Design

Process design encompasses both the identification of existing processes and the design of future processes. Areas of focus include representation of the process flow, the actors within it, alerts and notifications, escalations, standard operating procedures, service level agreements, and task handover mechanisms. Good design reduces the number of problems over the lifetime of the process. Whether or not existing processes are considered, the aim of this step is to ensure that a correct and efficient theoretical design is prepared. The proposed improvement could be in human-to-human, human-to-system, and system-to-system workflows and might target regulatory, market, or competitive challenges that businesses face.

Modeling

Modeling takes the theoretical design and introduces combinations of variables (e.g., changes in rent or materials costs that determine how the process might operate under different circumstances). It also involves running a "what-if analysis" on the processes: *"What if I have 75 percent of resources to do the same task?" "What if I want to do the same job for 80% of the current cost?"*

Execution

One way to automate processes is to develop or purchase an application that executes the required steps of the process; however, in practice, these applications rarely execute all the steps of the process accurately or completely. Another approach is to use a combination of software and human intervention; however this approach is more complex, making the documentation process difficult.

As a response to these problems, software has been developed that enables the full business process (as developed in the process design activity) to be defined in a computer language that can be directly executed by the computer. The system will either use services in connected applications to perform business operations (e.g., calculating a repayment plan for a loan) or will ask for human input when a step is too complex to automate. Compared

to either of the previous approaches, directly executing a process definition can be more straightforward and is, therefore, easier to improve. However, automating a process definition requires a flexible and comprehensive infrastructure, which typically rules out implementing these systems in a legacy IT environment.

Business rules have been used by systems to provide definitions for governing behavior, and a business rule engine can be used to drive process execution and resolution.

Monitoring

Monitoring encompasses the tracking of individual processes so that information on their state can be easily seen and statistics on the performance of one or more processes can be provided. An example of the tracking is being able to determine the state of a customer order (e.g., order arrival, awaiting delivery, invoice paid) so that operational problems can be identified and corrected.

In addition, this information can be used to work with customers and suppliers to improve their connected processes. Examples of the statistics are the generation of measures on how quickly a customer order is processed or how many orders were processed in the last month. These measures tend to fit into three categories: cycle time, defect rate, and productivity.

The degree of monitoring depends on what information the business wants to evaluate and analyze and how business wants it to be monitored—in real time, near real time, or ad hoc. Here, business activity monitoring extends and expands the monitoring tools in generally provided by BPMS.

Process mining is a collection of methods and tools related to process monitoring. process mining aims to analyze event logs extracted through process monitoring and to compare them with an a priori process model. Process mining allows process analysts to detect discrepancies between the actual process execution and the a priori model as well as to analyze bottlenecks.

Optimization

Process optimization includes retrieving process performance information from modeling or monitoring phase, identifying potential or actual bottlenecks and the potential opportunities for cost savings or other improvements, and applying those enhancements to the design of the process. This creates greater business value overall.

Meir H. Levi from the Interfacing Technologies Corporation, Montreal, Canada, states that "the awareness of business processes is the most important management paradigm today. The idea of the 'process organization' is gaining strong momentum; the process 'option' is now becoming a mandatory requirement. The integration of the Process Framework into the management structure introduces clear focus on consistent and collaborative ways to achieve results that directly impact the bottom line; hence, delighted customers and stakeholders."

Deploying BPM

Selecting Key Process(es)

Organizations operate dozens of major cross-functional business processes. From these, a few key processes are selected as the BPM focus. An organization's strategic plan provides guidance in selecting key processes. (See Chapter 7, Strategic Planning and Deployment: Moving from Good to Great.)

There are several approaches to selecting key business processes:

- The Critical Success Factor approach holds that, for any organization, relatively few (no more than eight) factors can be identified as "necessary and sufficient" for attaining its mission and vision. Once identified, these factors are used to select the key business processes and rank them by priority (Hardaker and Ward 1987).
- The Balanced Business Scorecard (Kaplan and Norton 1992) measures business performance in four dimensions: financial performance, performance in the eyes of the customer, internal process performance, and performance in organization learning and innovation. Performance measures are created and performance targets are set for each dimension. Using these measures to track performance provides a "balanced" assessment of business performance. Processes that create imbalances in the scorecard are identified as processes that need attention most—the key processes.
- Another approach is to invite upper management to identify a few (four to six) organization-specific critical selection criteria to use in evaluating the processes. Examples of such criteria are the effect on business success, the effect on customer satisfaction, the significance of problems associated with the process, the amount of resources currently committed to the process, the potential for improvement, the affordability of adopting BPM, and the effect of process on the schedule. Using these criteria and a simple scoring system (such as "low, medium, or high"), managers evaluate the many processes from the long list of the organization's major business processes (10 to 25 of them) and, by comparing the evaluations, identify the key processes. (The long list may be prepared in advance in a process identification study conducted separately, often by the chief quality officer, and often with the support of a consultant.

Whatever approach is used to identify key processes, the process map can be used to display the results. The "process map" is a graphic tool for describing an organization in terms of its business processes and their relationships to the organization's principal stakeholders. The traditional organization chart answers the question: "Who reports to whom?" The process map answers the question: "How does the organization's work get done?"

Organizing: Assigning Ownership, Selecting the Team, and BPM Infrastructure

Because certain major cross-functional business processes, the *key processes,* are critical to business success, the quality council sees to it that those processes are organized in a special way. After selecting key processes, the quality council appoints a process owner, who is responsible for making the process effective, efficient, and adaptable, and is accountable for its performance (Riley 1989, Riley et al. 1994).

For large complex processes, especially in large organizations, a two-tier ownership arrangement is used most often. An appointed executive owner operates as a sponsor, champion, and supporter at the upper management level and is accountable for process results. At the operating level, a working owner, usually a first- or second-level manager, leads the process-management team responsible for day-to-day operation. Owner assignments—executive owner and working owner—are ongoing. The major advantages of this structure are that there is, at the same time, "hands-on" involvement and support of upper management and adequate management of the process details.

The process-management team is a peer-level group that includes a manager or supervisor from each major function within the process. Each member is an expert in a segment of the process. Ideally, BPM teams have no more than eight members, and the individuals

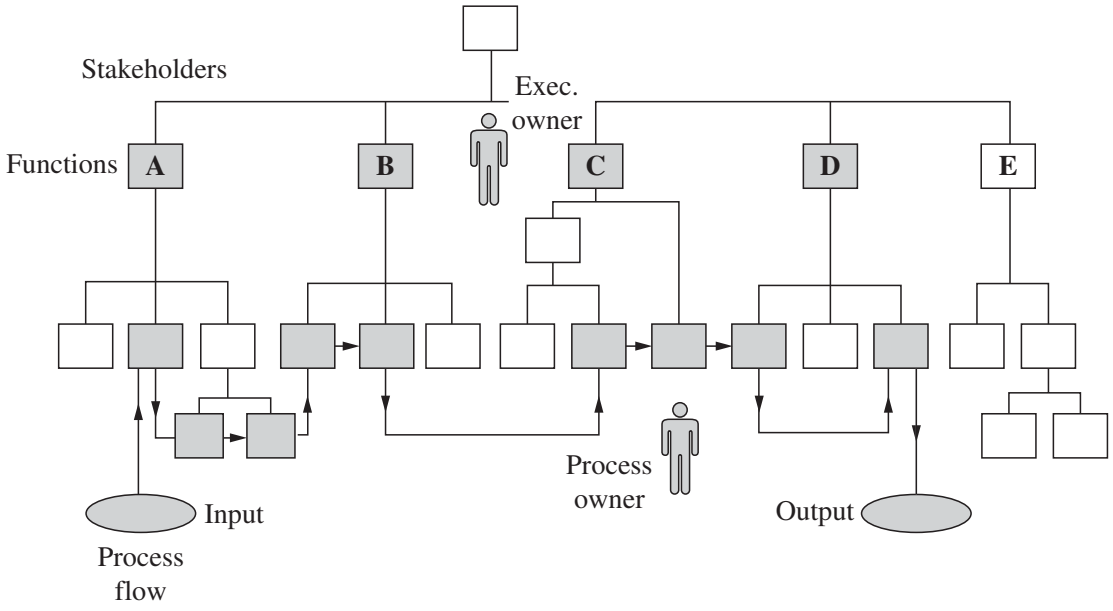

Figure 8.2 Diagram of a multifunctional organization and one of its major processes.

chosen should be proven leaders. The team is responsible for managing and continuously improving the process. The team shares with the owner the responsibilities for effectiveness and efficiency. Most commonly, team assignments are ongoing.

From time to time, a process owner creates an ad hoc team to address some special issue (human resources, information technology, activity-based costing, etc.). The mission of such a project-oriented team is limited, and the team disbands when the mission is complete. The ad hoc team is different from the process-management team.

Figure 8.2 is a simplified diagram of a multifunctional organization and one of its major processes. The shaded portions include the executive owner, the working owner, the BPM team, and the stakeholders—functional heads at the executive level who have work activities of the business process operating within their function. Customarily, stakeholders are members of the quality council, along with the executive owner. Taken together, this shaded portion is referred to as the BPM Infrastructure.

Establishing the Team's Mission and Goals

The preliminary process mission and improvement goals for the process are communicated to the owners (executive and working levels) and the team by the quality council. To do their jobs most effectively, the owners and the team must make the mission and goals their own. They do this by defining the process, the first step of the planning phase.

The Planning Phase: Planning the New Process

The first phase of BPM is planning, which consists of five steps: (1) defining the process, (2) discovering customer needs and flowcharting the process, (3) establishing measurements of the process, (4) analyzing process measurements and other data, and (5) designing (or redesigning) the process. The output of the planning phase is the new process plan.

Defining the Current Process

The owner(s) and the team collaborate to define the process precisely. In accomplishing this, the starting point and principal reference is the process documentation developed by the quality council during the selection of key processes and identification of owners and teams. This documentation includes preliminary statements of mission and goals.

Effective mission and goal statements explicitly declare

- The purpose and scope of the process
- "Stretch" targets for customer needs and business needs

(The purpose of the stretch target is to motivate aggressive process improvement activity.) For example, a mission statement for the Special-Contract Management Process is to provide competitive special pricing and supportive terms and conditions for large information systems procurements that meet customer needs for value, contractual support, and timeliness at affordable cost.

The goals for the same process are to

- Deliver approved price and contract support document within 30 days of date of customer's letter of intent.
- Achieve a yield of special-contract proposals (percent of proposals closed as sales) of not less than 50 percent.

The team must reach a consensus on the suitability of these statements, propose modifications for the quality council's approval, if necessary, and also document the scope, objectives, and content. Based on available data and collective team experience, the team will document process flow, process strengths and weaknesses, performance history, measures, costs, complaints, environment, and resources. This will probably involve narrative documentation and will certainly require the use of flow diagrams.

Bounding the business process starts with inventorying the major subprocesses—six to eight of them is typical—that the business process comprises. The inventory must include the "starts with" subprocess (the first subprocess executed), the "ends-with" subprocess (the last executed), and the major sub processes in between. If they have significant effect on the quality of the process output, activities upstream of the process are included within the process boundary. To provide focus and avoid ambiguity, it is also helpful to list subprocesses that are explicitly excluded from the business process. The accumulating information on process components is represented in diagram form, which evolves from a collection of subprocesses to a flow diagram as the steps of the planning phase are completed.

Figure 8.3 shows a high-level diagram of the special-contract process that resulted from process analysis but before the process was redesigned. At the end of the process definition step, such a diagram is not yet a flow diagram, as there is no indication of the sequence in which the subprocesses occur. Establishing those relationships as they presently exist is the work of Step 2.

Discovering Customer Needs and Flowcharting the Process

For the process to work well, the team must identify all customers, determine their needs, and prioritize the information. Priorities enable the team to focus its attention and spend its energies where they will be most effective.

Determining customer needs and expectations requires ongoing, disciplined activity. Process owners must ensure that this activity is incorporated in the day-to-day conduct of the business process as the customer requirements subprocess and assign accountability for

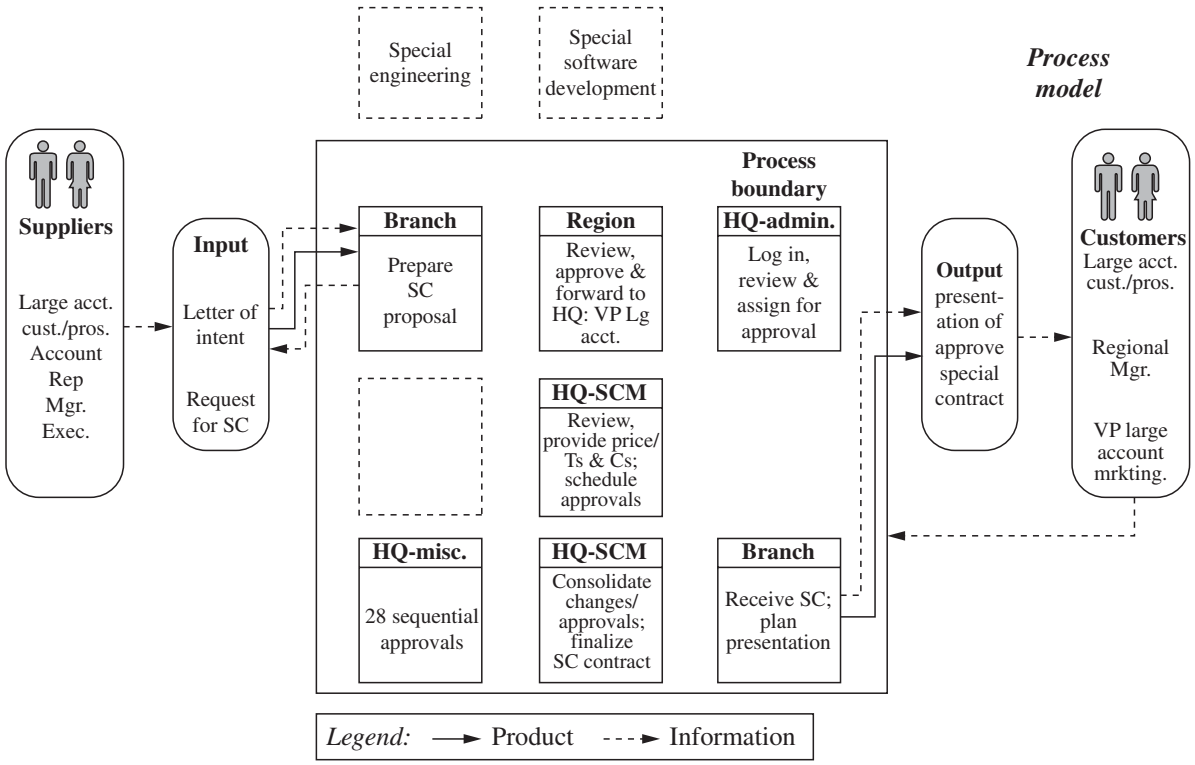

FIGURE 8.3 High-level diagram of the special-contract process.

its performance. The output of this vital activity is a continually updated customer requirement statement.

On the process flowchart, it is usual to indicate key suppliers and customers and their roles in the process as providers or receivers of materials, product, information, and the like. Although the diagram can serve a number of specialized purposes, the most important here is to create a common, high-level understanding among the owner and the team members of how the process works—how the subprocesses relate to each other and to the customers and suppliers and how information and product move around and through the process. In creating the process flowchart, the team will also verify the list of customers and may, as understanding of the process deepens, add to the list of customers.

The process flowchart is the team's primary tool for analyzing the process to determine whether it can satisfy customer needs. By walking through the chart together, step by step, sharing questions and collective experience, the team determines whether the process is correctly represented, making adjustments to the diagram as necessary to reflect the process as it presently operates.

When the step is complete, the team has a starting point for analyzing and improving the process. In Figure 8.4, the product flow is shown by solid lines and the information flow by dotted lines.

Establishing Process Measurements

What gets measured gets done. Establishing, collecting, and using the correct measures is critical in managing business process quality. "Process capability," "process performance," and other process measures have no practical significance if the process they

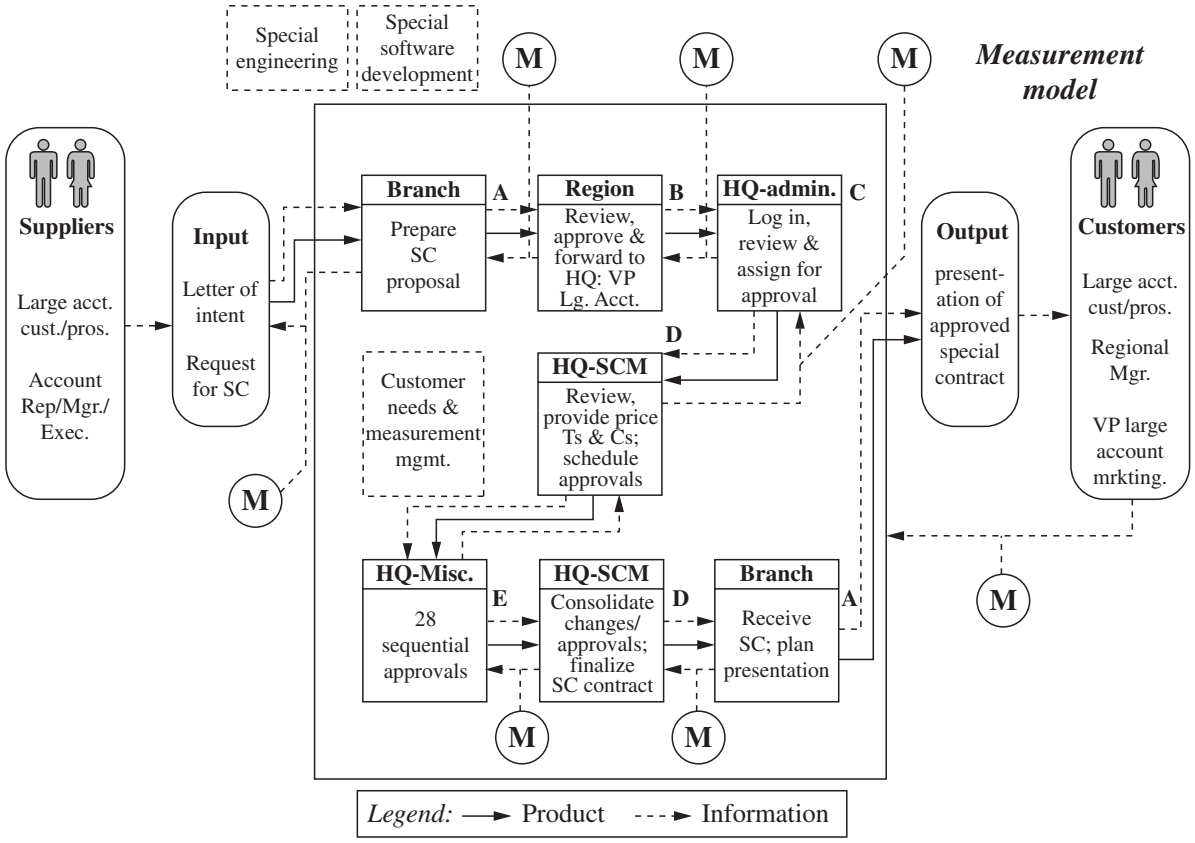

FIGURE 8.4 Flowchart of the special-contract process including process control points.

purport to describe is not managed. To be managed, the process must fulfill certain minimum conditions:

1. It has an owner.
2. It is defined.
3. Its management infrastructure is in place.
4. Its requirements are established.
5. Its measurements and control points are established.
6. It demonstrates stable, predictable, and repeatable performance.

A process that fulfills these minimum conditions is said to be *manageable.* Manageability is the precondition for all further work in BPM.

Of these criteria, (1) through (4) have already been addressed in this chapter. Criteria (5) and (6) are addressed as follows.

Process Measurements

In deciding what aspects of the process to measure, we look for guidance to the process mission and to our list of customer needs. Process measures based on customer needs provide a way of measuring process effectiveness. For example, if the customer requires delivery of an order within 24 hours of order placement, we incorporate into our order-fulfillment process

a measure such as "time elapsed between receipt of order and delivery of order," and a system for collecting, processing, summarizing, and reporting information from the data generated. The statistic reported to the executive owner will be one such as "percent of orders delivered within 24 hours," a statistic that summarizes on-time performance. The team will also need data on which to base analysis and correction of problems and continuous improvement of the process. For this purpose, the team needs data from which they can compute such descriptive statistics as distribution of delivery times by product type, among others. The uses to which the data will be put must be thought through carefully at the time of process design to minimize redesign of the measures and measurement systems.

Process measures based on cost, cycle time, labor productivity, and process yield measure process efficiency. Suppose that a goal for our order-fulfillment process is to reduce order-picking errors to one error per thousand order lines. Managing that goal requires identifying order-picking errors in relation to the number of order lines picked. For inadvertent order-picking errors—that is, when they happen, the picker is unaware of them—measuring them requires a separate inspection to identify errors. In a random audit on a sample of picked orders, an inspector identifies errors and records them. As with delivery-time measurement, the team must think through all the uses it will make of these measurements. To report an estimated error rate, the data needed are the number of errors and the number of order lines inspected. To improve process performance in this category, the data must help the team identify error sources and determine their root cause. For that to occur, each error must be associated with time of day, shift, product type, and size of package so that the data can be stratified to test various theories of root cause.

Although process adaptability is not a measurement category, it is an important consideration for process owners and teams. Adaptability is discussed later in the chapter.

Process measurements must be linked to business performance. If certain key processes must run exceptionally well to ensure organization success, it follows that collective success of the key processes is good for the organization's performance. Process owners must take care to select process measures that are strongly correlated with traditional business indicators, such as revenue, profit, return on investment, earnings per share, productivity per employee, and so on. In high-level business plan reviews, managers are motivated and rewarded for maintaining this linkage between process and organization performance measures because of the two values that BPM supports: organization success is good, and BPM is the way we will achieve organization success.

Figure 8.5 shows some typical process measurements and the traditional business indicators with which they are linked. To illustrate, "percent of sales quota achieved" is a traditional business indicator relating to the business objective of improving revenue. The special-contract management process has a major impact on the indicator, as more than 30 percent of U.S. revenue comes from that process. Therefore, the contract close rate (ratio of the value of firm contracts to the total value of proposals submitted) of the special-contract management process is linked to percent of sales quota and other traditional revenue measures, and is, therefore, a measure of great importance to management. Measurement points appear on the process flow diagram.

Control Points

Process measurement is also a part of the control mechanisms established to maintain planned performance in the new process. To control the process requires that each of a few selected process variables be the control subjects of a feedback control loop. Typically, there will be five to six control points at the macro-process level for variables associated with: external output, external input, key intermediate products, and other high-leverage process points. Control points in the special-contract management process are represented graphically

The traditional business view		The process view	
Business objective	**Business indicator**	**Key process**	**Process measure**
Higher revenue	Percent of sales quota achieved	Contract management	Contract close rate
	Percent of revenue plan achieved	Product development	Development cycle time
	Value of orders cancelled after shipment	Account management	Backlog management and system assurance timeliness
	Receivable days outstanding		Billing quality index
Reduce costs	S, G & A	Manufacturing	Manufacturing cycle time
	Inventory turns		

Figure 8.5 Typical process measurements and the traditional business indicators.

in Figure 8.4. Feedback loop design and other issues surrounding process control are covered in detail in Chapter 6, Quality Control: Assuring Repeatable and Compliant Processes.

Process Variability, Stability, and Capability

As in all processes, business processes exhibit variability. The tools of statistical process control such as Shewhart charts (see Chapter 6) help the team to minimize process variation and assess process stability.

Evaluation of process capability is an important step in process quality improvement. Process capability is a measure of variation in a process operating under stable conditions. The phrase "Under stable conditions" means that all variations in the process are attributable to random causes. The usual criterion for stability is that the process, as plotted and interpreted on a Shewhart control chart, is "in control."

Statistical process control, process capability, and associated tools are useful components of the process team's tool kit. They are covered in detail in Chapter 18, Core Tools to Design, Control, and Improve Performance.

The output of the measurement step is a measurement plan, a list of process measurements to be made and the details of making each one, including who will make it, how it will be made, and on what schedule.

Analyzing the Process

Process analysis is performed for the following purposes:

- Assess the current process for its effectiveness and efficiency.
- Identify the underlying causes of any performance inadequacy.
- Identify opportunities for improvement.
- Make the improvements.

Business process	Sub-process	Activity	Task
Procurement	Supplier selection	Supplier survey	Documentation of outside supplier
Development engineering	Hardware design	Engineering change	Convening the change board
Office administration	Providing administrative support services	Managing calendars	Making a change to existing calendar

Figure 8.6 Three levels of decomposition.

First, referring to the process flowchart, the team breaks the process into its component activities using a procedure called "process decomposition," which consists of progressively breaking apart the process, level by level, starting at the macro level. As decomposition proceeds, the process is described in ever-finer detail.

As the strengths and weaknesses of the process are understood at one level, the BPM team's interim theories and conclusions will help decide where to go next with the analysis. The team will discover that certain subprocesses have more influence on the performance of the overall business process than others (an example of the Pareto principle). These more significant subprocesses become the target for the next level of analysis.

Decomposition is complete when the process parts are small enough to judge as to their effectiveness and efficiency. Figure 8.6 shows examples from three levels of decomposition (subprocess, activity, and task) of three typical business processes (procurement, development engineering, and office administration).

Measurement data are collected according to the measurement plan to determine process effectiveness and efficiency. The data are analyzed for effectiveness (conformance to customer needs) and long-term capability to meet current and future customer requirements.

The goal for process efficiency is that all key business processes operate at minimum total process cost and cycle time while still meeting customer requirements.

Process *effectiveness* and *efficiency* are analyzed concurrently. Maximizing effectiveness and efficiency together means that the process produces high quality at low cost; in other words, it can provide the most *value* to the customer.

"Business process adaptability" is the ability of a process to readily accommodate changes both in the requirements and the environment while maintaining its effectiveness and efficiency over time. To analyze the business process, the flow diagram is examined in four steps and modified as necessary.

The Process Analysis Summary Report is the culmination and key output of this process analysis step. It includes the findings from the analysis, that is, the reasons for inadequate process performance and potential solutions that have been proposed and recorded by owner and team as analysis progressed. The completion of this report is an opportune time for an executive owner/stakeholder review.

The owner/stakeholder reviews can be highly motivational to owners, teams, stakeholders. Of particular interest is the presentation of potential solutions for improved process operation. These have been collected throughout the planning phase and stored in an idea bin. The design suggestions are now documented and organized for executive review as part of the process analysis summary report presentation.

In reviewing potential solutions, the executive owner and the quality council provide the selection criteria for acceptable process design alternatives. Knowing upper management's criteria for proposed solutions helps to focus the process-management team's design efforts and makes a favorable reception for the reengineered new process plan more likely.

Designing (or Redesigning) the Process

In Process Design, the team defines the specific operational means for meeting stated product goals. The result is a newly developed Process Plan. Design changes fall into five broad categories: workflow, technology, people and organization, physical infrastructure, and policy and regulations.

In the design step, the owner and the team must decide whether to create a new process design or to redesign the existing process. Creating a new design might mean radical change; redesign generally means incremental change with some carryover of existing design features.

The team will generate many design alternatives, with input from both internal and external sources. One approach to generating these design alternatives from internal sources is to train task level performers to apply creative thinking to the redesign of their process.

Ideas generated in these sessions are documented and added to the idea bin. Benchmarking can provide a rich source of ideas from external sources, including ideas for radical change. Benchmarking is discussed in detail in Chapter 15.

In designing for process effectiveness, the variable of most interest is usually process cycle time. In service-oriented competition, lowest process cycle time is often the decisive feature. Furthermore, cycle–time reduction usually translates to efficiency gains as well. For many processes, the most promising source of cycle–time reduction is introducing new technology, especially information technology.

Designing for speed creates surprising competitive benefits: growth of market share and reduction of inventory requirements. Hewlett-Packard, Brunswick Corp., GE's Electrical Distribution and Control Division, AT&T, and Benetton are among the companies who have reported stunning achievements in cycle-time reduction for both product development and manufacturing (Dumaine 1989). In each of the companies, the gains resulted from efforts based on a focus on major processes. Other common features of these efforts included the following:

- Stretching objectives proposed by top management
- Absolutely adhering to the schedule, once agreed to
- Applying state-of-the art information technology
- Reducing management levels in favor of empowered employees and self-directed work teams
- Putting speed in the culture

In designing for speed, successful redesigns frequently originate from a few relatively simple guidelines: eliminate handoffs in the process, eliminate problems caused upstream of activity, remove delays or errors during handoffs between functional areas, and combine steps that span businesses or functions. A few illustrations are provided as follows:

- *Eliminate handoffs in the process.* A "handoff" is a transfer of material or information from one person to another, especially across departmental boundaries. In any process involving more than a single person, handoffs are inevitable. It must be recognized, however, that the handoff is time consuming and full of peril for process

integrity—the missed instruction, the confused part identification, the obsolete specification, the miscommunicated customer request. In the special-contract management process, discussed previously in the chapter, the use of concurrent review boards eliminated the 28 sequential executive approvals and associated handoffs.

- *Eliminate problems caused upstream of activity.* Errors in order entry at a U.S. computer organization were caused when sales representatives configured systems incorrectly. As a result, the cost of the sales-and-order process was 30 percent higher than that of competitors, and the error rates for some products were as high as 100 percent. The cross-functional redesign fixed both the configurations problem and sales-force skills so that on-time delivery improved at significant cost savings (Hall et al. 1993).
- *Remove delays or errors during handoffs between functional areas.* The processing of a new policy at a U.K. insurance organization involved 10 handoffs and took at least 40 days to complete. The organization implemented a case-manager approach by which only one handoff occurred, and the policy was processed in less than 7 days (Hall et al. 1993).
- *Combine steps that span businesses or functions.* At a U.S. electronics equipment manufacturer, as many as seven job titles in three different functions were involved in the nine steps required to design, produce, install, and maintain hardware. The organization eliminated all but two job titles, leaving one job in sales and one job in manufacturing (Hall et al. 1993).

Process design testing is performed to determine whether the process design alternative will work under operating conditions. Design testing may include trials, pilots, dry runs, simulations, etc. The results are used to predict new process performance and cost/benefit feasibility.

Successful process design requires employee participation and involvement. To overlook such participation creates a lost opportunity and a barrier to significant improvement. The creativity of the first-line work force in generating new designs can be significant.

Creating the New Process Plan

After we have redefined a key process, we must document the new process and carefully explain the new steps. The new process plan now includes the new process design and its control plan for maintaining the new level of process performance. The new process plan for the special-contract management process, shown as a high-level process schematic, is shown in Figure 8.7.

The Transfer Phase: Transferring the New Process Plan to Operations

There are three steps in the transfer phase: (1) planning for implementation problems, (2) planning for implementation action, and (3) deploying the new process plan.

Planning for Implementation Problems

A major BPM effort may involve huge expenditures and precipitate fundamental change in an organization, affecting thousands of jobs. All of this poses major management challenges. All of the many changes must be planned, scheduled, and completed so that the new process may be deployed to operational management. Figure 8.8 identifies specific categories of problems to be addressed and the key elements that are included.

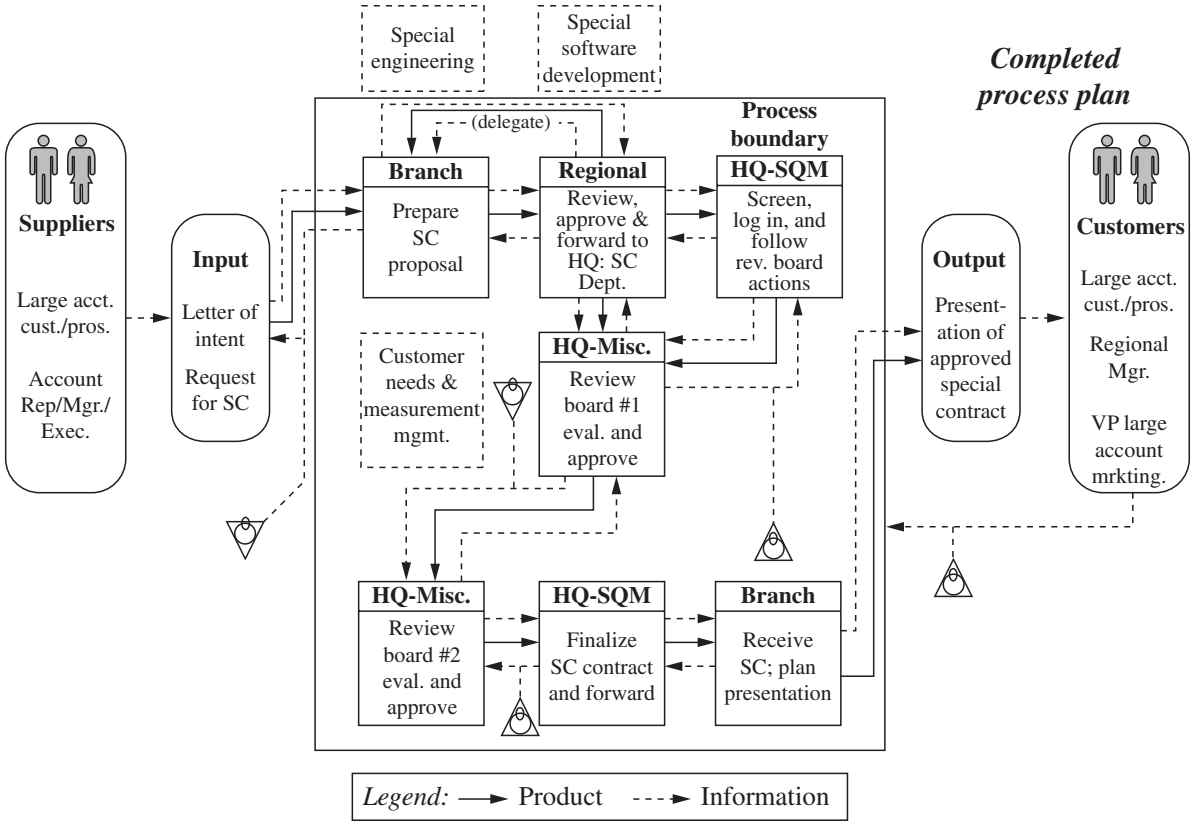

FIGURE 8.7 High-level process schematic.

Category	Key elements
Workflow	Process anatomy (macro/micro; cross-functional; intra-functional; inter-departmental; intra-departmental)
Technology	Information technology; automation
People and organization	Jobs; job description; training and development, performance management; compensation (incentive-based or not); recognition/reward; union involvement; teams; self-directed work teams; reporting relationships; de-layering.
Infrastructure (physical)	Location; space; layout; equipment; tools; furnishings
Policy/regulations	Government; community; industry; company; standards; culture
New-process design issues	Environmental, quality, costs, sourcing

FIGURE 8.8 Specific categories of problems to be addressed.

Of the five categories listed in Figure 8.8, "people and organization" is usually the source of the most challenging change issues in any BPM effort. Implementation issues in the people and organizational design category include new jobs, which are usually bigger; new job descriptions; training people in the new jobs; new performance plans and objectives; new compensation systems (incentive pay, gain sharing, and the like); new recognition and reward mechanisms; new labor contracts with unions; introduction of teamwork and team-building concepts essential to a process orientation; formation of self-directed work teams; team education; reduction of management layers; new reporting relationships; development and management of severance plans for those whose jobs are eliminated; temporary continuation of benefits; outplacement programs; and new career paths based on knowledge and contribution, rather than on promotion within a hierarchy. The list goes on. Additionally, there are changes in technology, policy, and physical infrastructure to deal with.

The importance of change management skills becomes clear. Deploying a new process can be a threat to those affected. The owner and the team must be skilled in overcoming resistance to change.

Creating Readiness for Change

Change happens when four conditions are combined. First, the current state must be seen as unsatisfactory, even painful; it must constitute a tension for change. Second, there must be a satisfactory alternative, a vision of how things can be better. Third, some practical steps must be available to reach the satisfactory state, including instruction in how to take the steps, and support during the journey. Fourth, to maintain the change, the organization and individuals must acquire skills and reach a state of self-efficacy.

These four conditions reinforce the intent to change. Progress toward that change must be monitored continuously to make the change permanent. In the operational management phase, operational controls, continuous improvement activity, and ongoing review and assessment all contribute to ensuring that the new process plan will continue to perform as planned.

Planning for Implementation Action

The output of this step is a complex work plan, to be carried out by the owner and the BPM team. They will benefit from skills in the techniques of Project Management.

Deploying the New Process Plan

Before actually implementing the new process, the team tests the process plan. They test selected components of the process and may carry out computer simulations to predict the performance of the new process and determine its feasibility. Also, tests help the team refine the "roll out" of the process and decide whether to conduct parallel operation (old process and new process running concurrently). The team must decide how to deploy the new process. There are several options

- Horizontal deployment, function by function.
- Vertical deployment, top down, all functions at once.
- Modularized deployment, activity by activity, until all are deployed.
- Priority deployment, subprocesses and activities in priority sequence, those having the highest potential for improvement going first.

- Trial deployment, a small-scale pilot of the entire process, then expansion for complete implementation. This technique was used in the first redesign of the special-contract management process, that is, a regional trial preceded national expansion. The insurance organization USAA conducts all pilot tests of new process designs in their Great Lakes region. In addition to "working the bugs out of the new design before going national," USAA uses this approach as a "career-broadening experience for promising managers," and to "roll out the new design to the rest of the organization with much less resistance" (Garvin 1995).

Full deployment of the new process includes developing and deploying an updated control plan. Figure 8.9 lists the contents of a new process plan.

Operational Management Phase: Managing the New Process

The Operational Management Phase begins when the process is put into operation. The major activities in operational management are (1) process quality control, (2) process quality improvement, and (3) periodic process review and assessment.

Business Process Metrics and Control

"Process control" is an ongoing managerial process, in which the actual performance of the operating process is evaluated by measurements taken at the control points, comparing the measurements to the quality targets, and taking action on the difference. The goal of process control is to maintain performance of the business process at its planned level. (See Chapter 6, Quality Control: Assuring Repeatable and Compliant Processes.)

Process plan

Process purpose or mission
Process goals and targets
Process management infrastructure (process owner, team, stakeholder)
Process contract
Process description and model
Customer requirements (customer list, customer needs, requirements statement
Process flow
Measurement plan
Process analysis summary report
Control plan
Implementation action plan
Resource plan
Schedules and timeline

FIGURE 8.9 Contents of a new process plan.

Business Process Improvement

By monitoring process performance with respect to customer requirements, the process owner can identify gaps between what the process is delivering and what is required for full customer satisfaction. These gaps are targets for process quality improvement efforts. They are signaled by defects, complaints, high costs of poor quality, and other deficiencies. (See Chapter 6, Quality Control: Assuring Repeatable and Compliant Processes.)

Periodic Process Review and Assessment

The owner conducts reviews and assessments of current process performance to ensure that the process is performing according to plan. The review should include a review and an assessment of the process design itself to protect against changes in the design assumptions and anticipated future changes such as changes in customer needs, new technology, or competitive process designs. It is worthwhile for the process owner to establish a schedule for reviewing the needs of customers and evaluating and benchmarking the present process.

As customer needs change, process measures must be refined to reflect these changes. This continuous refinement is the subject of a measurement management subprocess, which is established by the owners and the team and complements the customer's needs subprocess. The two processes go hand in hand.

The business process management category in the Malcolm Baldrige National Quality Award criteria provides a basis for management review and assessment of process performance.

Other external award criteria from worldwide sources, as well as many national and international standards, serve as inspiration and guidance for owners and teams contemplating process reviews.

The criteria of the Malcolm Baldrige National Quality Award have come to be regarded as the de facto definition of performance excellence. Business process management is an important concept within the performance excellence framework.

Organizations have learned not to limit managerial attention to the financial dimension. They have gained experience in defining, identifying, and managing the quality dimension. They are accustomed to thinking strategically—setting a vision, mission, and goals, all in alignment. And they will have experience reviewing progress against those goals.

The quality improvement process, which began in Japan in the 1950s and was widely deployed in the United States in the early 1980s, was an important step beyond functional management. Organizations found that quality improvement required two new pieces of organization machinery—the quality council and the cross-functional project team. The Quality Council usually consists of the senior management team; to its traditional responsibility for management of finance the responsibility for the management of quality is added. The project team recognizes that, in a functional organization, responsibility for reducing chronic deficiencies has to be assigned to a cross-functional team.

BPM is a natural extension of many of the lessons learned in early quality improvement activities. It requires a conceptual change—from reliance on functional specialization to an understanding of the advantages of focusing on major business processes. It also requires an additional piece of organization machinery: an infrastructure for each of the major processes.

The Future of BPM Combined with Technology

Business process management (BPM) is being combined with service-oriented architectures (SOAs) technologies and performance excellence tools such as Lean and Six Sigma to

accelerate improvements and results. At the same time, these tools are increasing organizational flexibility and technology-enabled responsiveness. Many successful organizations have found that the linkages are clear.

According to IBM (*Reference: "Aligning Business Process Management, Service-Oriented Architecture, and Lean Six Sigma for Real Business Results)*, early adopters who have worked their way past cultural and organizational barriers are seeing impressive performance and financial results, seen as follows:

- Improved responsiveness to market challenges and changes through aligned and significantly more flexible business and technical architectures
- Improved ability to innovate and achieve strategic differentiation by driving change into the market and tuning processes to meet the specific needs of key market segments
- Reduced process costs through automation and an improved ability to monitor, detect, and respond to problems by using real-time data, automated alerts, and planned escalation
- Significantly lower technical implementation costs through shared process models and higher levels of component reuse
- Lower analysis costs and reduced risk through process simulation capabilities and an improved ability to gain feedback and buy-in prior to coding

The rewards can be great, especially for those who take action now.

References

Dumaine, B. (1989). "How Managers Can Succeed through Speed." Fortune, February. 13, pp. 54–60.

Garvin, D. A. (1995). "Leveraging Processes for Strategic Advantage." *Harvard Business Review,* September/October, vol. 73, no. 5, pp. 77–90.

Hall, G., Rosenthal, J., and Wade, J. (1993). "How to Make Reengineering Really Work." *Harvard Business Review,* November/December, vol. 71, no. 6, pp. 199–130.

Kane, E. J. (1986). "IBM's Focus on the Business Process." *Quality Progress,* April, p. 26.

Kaplan, R. S., and Norton, D. P. (1992). "The Balanced Scorecard—Measures that Drive Performance." *Harvard Business Review,* January/February, vol. 7, no. 1, pp. 71–79, reprint #92105.

Levi, M. H. "Transformation to Process Organization." Interfacing Technologies Corporation, http://www.interfacing.com/uploads/File/The%20Business%20Process-Meir%20Levi.pdf

Pall, G. A. (1987). *Quality Business Process Management.* Prentice-Hall, Inc., Englewood Cliffs, NJ.

Riley, J. F., Jr. (1989). *Executive Quality Focus: Discussion Leader's Guide.* Science Research Associates, Inc., Chicago.

Riley, J. F., Jr., Pall, G. A., and Harshbarger, R. W. (1994). *Reengineering Processes for Competitive Advantage: Business Process Quality Management* (*BBPM*), 2nd ed., Juran Institute, Inc., Wilton, CT.