Implementing Process Management for Improving Products and Services

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# Implementing Process Management for Improving Products and Services

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I. RATIONALE
Organizational survival depends on meeting the minimum requirements set by the market for a product or service. A competitive advantage stems from understanding and meeting customer needs better than others can do. In today’s fast-paced, global environment “better” means more than delivering a higher-quality product or service. It entails doing it faster, with fewer steps and transactions. It also means doing required work cheaper by eliminating the costs, barriers, and structures that drive up non-value-adding costs.

The ability to create optimal value for customers is the defining feature of a successful organization in this environment. Customer value is the basis for the price of a product or service in the market. Customer value is not created by one function or by one individual. Its creation requires the ongoing, active collaboration and cooperation of multiple groups and people, both within and across organizational boundaries.

Process management provides an organization with the framework required to bridge the gaps among persons, activities, functions, subunits, and trading partners that can increase the costs and decrease the effectiveness of the value chain. Process management emphasizes the flow of activities and efforts and their linkage into high-performing chains of customers. Its goal is to increase the value created for customers by eliminating the activities and constraints that impede cooperative effort—to bridge the white spaces in the organizational chart.

Implementing process management entails a shift in the mindset and perspective of management, active collaboration of diverse persons and functions, and the ongoing search for continuous and quantum performance improvements. Process management helps an organization rethink the structure and flow of the work that comprises or supports the creation of customer value, focusing efforts to those activities and resources that have the greatest impact on process performance.

II. SCOPE
This Statement on Management Accounting (SMA) has been written to help an organization understand the basic issues that define and shape a process-focused management system. Reflecting a long-term, strategic focus, this SMA provides insights and information to enable an organization to adopt a process orientation and achieve the performance improvements this initiative can provide.

Underlying the issues and discussion in this SMA is the belief that horizontal integration of workflows across organizational boundaries (internal or external) is the key to improving responsiveness, flexibility, and performance. Lack of horizontal coordination can result in miscommunication, delays, rework, missed deadlines, and any number of other forms of waste. Only through active management of the horizontal flow of activities, resources, and results can an organization and its trading partners optimize performance. Value is created for customers across the organization. Process management makes this fact visible.

The scope of this SMA does not include the development and completion of process maps or the creation of a process mindset. Instead, it emphasizes the fundamental characteristics of process management to provide a basis for creating a process implementation plan.
The concepts discussed here apply to:

- large and small organizations; and
- enterprises in all business sectors.

The information in this SMA will help financial professionals and others:

- comprehend the underlying principles of process management;
- understand the basic elements and characteristics of a process;
- determine the uses and benefits of process management;
- develop a basic process management implementation framework;
- create a process management approach that includes ongoing improvement, measurement, and evaluation;
- develop an understanding of ways to bridge intra- and interorganizational boundaries; and
- broaden awareness of the principles and challenges in designing, implementing, and using process management.

III. DEFINING PROCESS MANAGEMENT

A process is a structured, measured set of activities designed to produce a specified output for a specific customer or market. Process management is a unique approach to structuring and coordinating the horizontal flow of activities that link a company to its trading partners and the market. It is driven by a common set of objectives that serve to improve the focus, efficiency, and effectiveness of cross-functional, cross-organizational initiatives. These objectives include:

- providing optimal value to customers;
- defining the performance requirements for the process;
- meeting the performance requirements of customers and trading partners;
- eliminating waste or nonessential activities from the value chain;
- improving the profitability of the organization and its partners through reduction of nonessential costs and activities;
- creating and sharing best practices among trading partners; and
- increasing the responsiveness and flexibility of the value chain to changing customer requirements.

A process management structure is customer driven and supplier supported and coordinated. It emphasizes attaining improved knowledge of how work is done, and what the impact of various procedures and structures is on the effectiveness and efficiency of the key processes of the organization. Process management replaces the piecemeal approaches and initiatives designed to remedy problems in one part of the organization while tending to ignore the interrelationship of one function or activity with another—it is a world view that emphasizes system solutions. Combating the traditional “silo” culture and structure of organizations, process management emphasizes the critical interfaces or linkages that define and shape entity performance.

As suggested by Exhibit 1, processes span the underlying functions that have traditionally defined organizational structure. Processes do not replace functions—they deploy functions to ensure that organizational objectives are achieved. Process management coordinates the efforts of multiple functions to ensure a smooth flow of goods and services to the customer. While not all processes are core, directly tied to external customer requirements, each is driven by the recognition that the next person in the process is a customer to be served.
Rummler and Brache note that business processes are the mechanisms that convert innovation, ideas, and plans into products and services. The greatest opportunities for performance improvement often lie in the functional interfaces. While it may seem logical to view an organization as a process, it has been found consistently that the process level is the weakest element of an organization. Because processes span functional boundaries they require coordination and cooperation outside of an individual’s or function’s traditional responsibilities. A traditional organizational chart does not allow an organization to see the workflow used to develop, produce, and deliver a product or service. What the organization does, whom it is done for (the customer), and how the work is done are hidden from view. Process maps and a process perspective bring these vital relationships into focus, ensuring that the resources of the organization are directed toward those activities and outcomes that provide direct benefit to customers. In summary, process management:

- includes the three ingredients that are overlooked by a traditional organizational chart—the customer, the product, and the flow of work;
● enables an organization to see how work actually gets done, which is through processes that cut across its functional boundaries; and
● shows the internal customer-supplier relationships through which products and services are delivered.

Three basic levels of performance or structure are embedded within process management: organization, process, and job/performance, as illustrated in Exhibit 2. The organizational level focuses on the organization’s ties to its market, customer, and trading partners. It is the domain of strategy and its deployment—the “what” that drives choice and action. The process level, on the other hand, emphasizes the execution of the strategy, or how the work gets done. Process performance is defined and driven by stakeholder requirements and the organization’s strategy. Finally, the job/performer level recognizes that while outputs are managed through processes, process work is performed and managed by people.

Strategic and tactical goals, process and organizational design, and innovative management techniques interact to create a unique framework for action within process management. Goals define the specific product and service quality, quantity, timeliness, and cost requirements established by the customer or market. Design encompasses the configuration of people, assets, and activities to support the efficient attainment of goals. Finally, management practices must ensure that goals are met and design decisions yield promised benefits.

Adaptation and growth depend on understanding and optimizing the use of resources to improve continually on the organization’s ability to meet or exceed customer requirements. Process management brings to light the key drivers of business performance, highlighting the interdependencies that define, enable, or constrain an organization’s potential. Using the basic building blocks of a process—transformation, feedback control, and repeatability—process management helps an organization build flexibility and responsiveness into its structure.

IV. ELEMENTS OF A PROCESS

All systems, whether business in nature or not, can be defined in terms of two basic concepts: information and processes. Information provides an organization with knowledge about things in the world and the way they are organized. Processes then operate on this information and transform it, by either changing it directly or using it to create new information. Information is not solely an esoteric concept—it includes all business operations that are defined by work procedures. It is the flow of information that links activities into processes and multiple processes together into effective organizational structures.

A process is a physical representation of the flow of information within an organization, as it supports the creation of value for customers. If functioning properly, this transformation should provide reliable, repeatable service levels. Ensuring the reliability of process transformations requires various forms of feedback control, which help alert management to process problems and identify appropriate remedial actions.

Combining these issues, then, the three key elements of a process are:

● transformation: by means of one or more changes, provides output from a group of interrelated work activities that is of greater value than the inputs;
● feedback control: involves some regulatory
### Exhibit 2. Key Process Performance Dimensions

<table>
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<tr>
<th>Performance Levels</th>
<th>Goals</th>
<th>Design</th>
<th>Management</th>
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| **Organizational Level** | **ORGANIZATION GOALS** | - How the organization's strategy/direction been articulated and communicated.  
- Does the strategy make sense in terms of the external threats and opportunities and the internal strengths and weaknesses?  
- Given this strategy, have the required outputs of the organization and the level of performance expected from each output been expected and communicated? | **ORGANIZATION DESIGN** | - Are all relevant functions in place?  
- Are all functions necessary?  
- Is the current flow of inputs and outputs between functions appropriate?  
- Does the formal organization structure support the strategy and enhance the efficiency of the system? | **ORGANIZATION MANAGEMENT** | - Have appropriate function goals been set?  
- Is relevant performance measured?  
- Are resources appropriately allocated?  
- Are the interfaces between functions being managed? |
| **Process Level** | **PROCESS GOALS** | - Are the goals for key processes linked to customer/organization requirements? | **PROCESS DESIGN** | - Is this the most efficient/effective process for accomplishing the process goals? | **PROCESS MANAGEMENT** | - Have appropriate process subgoals been set?  
- Is process performance managed?  
- Are sufficient resources allocated to each person?  
- Are the interfaces between process steps being managed? |
| **Job/Performance Level** | **JOB GOALS** | - Are job outputs and standards linked to process requirements (which in turn are linked to customer and organization requirement)? | **JOB DESIGN** | - Are process requirements reflected in the appropriate jobs?  
- Are job steps in a logical sequence?  
- Have supportive policies and procedures been developed? Is the job environment ergonomically sound? | **JOB MANAGEMENT** | - Do the performers understand the job goals (outputs they are expected to produce and standards they are expected to meet)?  
- Do the performers have sufficient resources, clear signals and priorities, and a logical job design?  
- Are the performers rewarded for achieving the job goals?  
- Do the performers know if they are meeting the job goals?  
- Do the performers have the necessary knowledge/skill to achieve the job goals?  
- If the performers were in an environment in which the five questions listed above were answered "yes" would they have the physical, mental, and environmental capacity to achieve the job goals? |

means by which the transformation activities are modified or collected to maintain certain attributes of the output; and
- repeatability: implies that a process is executed many times in the same manner.

These three elements are found in any process, regardless of the type of work it performs or the output it provides to customers.

Looking at Exhibit 3, the interaction of these three key process elements and the underlying information flows that bring them together is evident. Representing a typical purchasing procedure for obtaining a good or service from a supplier, the exhibit depicts transformations (as rounded boxes) and feedback control (as arrows) for assessing the requisition’s accuracy as well as for establishing and revising delivery dates. Repeatability is built into the diagram through the flow itself as well as through the reference to “approved supplier list” as a source of data that must be checked during the purchasing activity.

The need to coordinate several different functions is also evident as the flow of the purchasing activity is reviewed. First, the initial request...
comes from an outside department that completes the requisition. Purchasing then handles the transaction, turning to receiving to ensure that the right items are shipped and received. As the order is completed, purchasing interacts with accounts payable to notify them that payment is now due on the items received. To the extent that the organization has a quality function in place, the requisition errors, as well as the assessment of prior performance of approved vendors, can be added to the list of activities and issues that are coordinated within this simple workflow.

Not every process step is transformational in nature. In some cases, the purpose of the activity in the flow is to assess accuracy or to aid in making a choice. For instance, in Exhibit 3 the nonrounded boxes represent information that is unchanged by the process. This information is used by the process but is unchanged by it. It is important to document both transformational activities and those in which the process does not change information. Each activity must be performed correctly for the process to achieve its goals.

Clearly, Exhibit 3 is not a complete process flow map but rather is a piece of the entire set of activities and interactions that take place, from the initial recognition that goods or services will need to be acquired through to the use of these items by the organization. The procurement subprocess, normally embedded in the core process called order-to-payment, sets the limits on the responsiveness and quality of the organization’s productive efforts.

V. CLASSIFICATION OF PROCESSES

Many different purposes are served by processes, resulting in three primary types of processes within adopting organizations as shown in Exhibit 4:

- core processes;
- management processes; and
- support processes.

A core process directly affects the value created for customers, provides a basis for creating a competitive advantage, or is essential to the functioning of the supply chain. The most common core process is the order-to-payment process, depicted in Exhibit 4 as an operational process. For some organizations, such as Corning Glass, core processes comprise its innovation efforts, which provide it with long-term strategic benefits.

Reflecting the core competencies of the organization—those things that it must do well if it is to remain a viable player in the market—core processes embody the key value-creating processes of the organization. In other words, a core process is one that influences either a competitive advantage that must be overcome or a competitive advantage that senior management wants to establish, reinforce, or expand. A current or future customer lies at the end of every core process.

Management processes enable core processes and ensure that customers are not inconvenienced by the organization. If errors occur in a management process such as accounts receivable, a customer may be dissatisfied with the overall transaction with the organization. Management processes may not directly create value for customers, but they can destroy it unless properly managed. Management processes are key enablers, and indirect influencers, of customer value.

Management processes are an integral part of the organization’s ability to create reliable, effective products and services for its customers.
Exhibit 4 management processes begin with the term “manage.” As can be seen, these processes include information systems, financial and physical asset management, supplier and other key external relationships, and the continuous improvement efforts of the organization.

The last category, support processes, can include human resources, product development, information technology, and environmental management. These processes are part of managing the business and responding to noncustomer requirements such as government regulations. They cannot be ignored, but they do not create value for today’s customers. An organization that does not develop its human resources or properly execute its environmental management programs may fail to survive to achieve its strategic and operational goals.

Every organization has a blend of these three types of processes within its structure. Even a virtual corporation will retain one or more of these processes, either directly or through contractual relationships. Although the type of process may vary both within one organization over time or between different companies, each retains a core set of characteristics.
VI. CHARACTERISTICS OF A PROCESS
While each process is a unique reflection of the organization it serves, some general features are part of every type of process. Specifically, six primary characteristics describe and shape a process:

- **Defined ownership:** Process owners are accountable for the functioning and performance of a process and have the requisite authority to make or oversee the making of changes to the process. For most administrative processes, the owner is an individual. In certain manufacturing settings, a computer may serve as the process owner as it integrates the activities of various machines making up the workflow.

- **Defined boundaries:** A second key feature of effective processes is the establishment of clear boundaries and interfaces. Process boundaries serve to define the limits and objectives of a set of activities. For instance, an accounts payable process may start with the receipt of an invoice (input) and end with the mailing of a check (output). In process management, boundaries serve to identify the input and output sides of the underlying workflow, making it easier to assign ownership and manage key interface issues between processes and subprocesses.

- **Documented workflows:** When most people think of process management, process flow mapping comes to mind. An essential communication tool and visual support, process maps define the process, its boundaries, effectiveness, inputs, outputs, key control points, and owners. This documentation can be completed in words, symbols, or some combination of the two.

- **Established control points:** Control is a special type of information used by process management to detail under what conditions a process is to be activated as well as defining key points in the process at which inspection or verification should occur.

- **Established measurements:** Measurement plays a key role in organizations, defining expectations for individuals or processes and ensuring that defined customer requirements are met effectively and efficiently. Five general types of measurements can be used in process settings: conformance metrics; responsiveness measures; measures of service level performance; measure of the degree of repetition or reliability of the process; and cost measures.

- **Control of process deviations:** An effective process has to be monitored constantly to ensure that its performance remains within specification. Within process management, process deviation signals the need to take corrective action—not simply sort bad output from good. If corrective action is not taken, the process cannot be regulated or improved. The result is instability and the potential failure of the process. Corrective action requires feedback. Providing this feedback is a primary role of an effective set of process measurements.

If any of these characteristic traits is overlooked or ambiguously applied, the process will not function smoothly and have the required level of repeatability and reliability. Having examined the core features of process management, what are the primary reasons for implementing it within an organization?

VII. WHY IMPLEMENT PROCESS MANAGEMENT
Processes exist within an organization, whether or not they are documented, defined, managed, or controlled. Process management focuses attention on the workflows of the organization,
bringing to light miscommunication, fumbles,
and other errors that inhibit performance.
Process management can be used in any type of
organization and to structure any workflow. Its
implementation can provide the following bene-
fits to the adopting organization:

- increased customer satisfaction and loyalty;
- improved organization and value chain
  profitability;
- increased flexibility and responsiveness to
  changing requirements;
- reduced miscommunication;
- increased effectiveness and efficiency in per-
  forming key activities;
- reduction of waste and delays;
- elimination of nonvalue-added work and out-
  puts from the organization’s or trading part-
  ners’ structures;
- decreased time-to-market for new or existing
  products and services;
- enhanced competitive position as speed,
  responsiveness, and focus are improved; and
- integration of activities and outcomes across
  functional and organizational boundaries in the
  value chain.

Process management has broad applications for
service and manufacturing organizations, in both
their core and support activities and workflows.
Process management is a primary enabler for the
implementation of effective, integrated sup-
ply chain management. The implementation of
process management can help an organization
and its trading partners in the following ways:

- anticipate and react to environmental changes
  before they occur through improved communi-
  cation, along the supply chain, between func-
  tions, and with various customers and markets;
- continually improve the efficiency and effective-
  ness of primary and supporting workflows;
- embed the voice of the customer in the organi-
  zation through improved identification and
  focus on key customer requirements and
  expectations;
- create a systems perspective that will ensure
  that decisions and improvement efforts do not
  result in fragmented improvements that actual-
  ly reduce overall entity performance as they
  create new work, and waste, in other areas of
  the organization;
- optimize profits for the entire value chain by
  ensuring that nonvalue-added work and other
  forms of waste are eliminated, where possible,
  in the core and supporting workflows of the
  organization; and
- link individual, group, and organizational perspec-
  tives to ensure that everyone understands their
  role within the overall supply chain, how their
  effort affects customers or other stakeholders,
  and what they can do to improve entity perfor-
  mance by better supporting efforts in other
  areas of the organization and supply chain.

The question is not whether a company should
deploy process management but rather whether
the processes that it comprises should be visibly
and consciously managed for optimal effective-
ness. Process management makes it easier to
visualize, control, synchronize, and optimize the
work completed by an organization and the relat-
ed resource implications of these efforts. A deci-
sion not to implement process management
does not eliminate the role of processes in
affecting organization performance—it simply
hides the information needed to bridge perfor-
mance gaps and improve results.

VIII. THE ROLE OF
MANAGEMENT ACCOUNTING
Process management requires discipline, relies on
information for its deployment, and is the key driver
of performance effectiveness and efficiency. On
each of these dimensions, the skills and competencies of the finance professional can be accessed to the organization’s benefit. Specific areas where financial practitioners can support or participate in process management initiatives include:

- identify and measure process resources;
- develop and execute process audits and identify key areas of opportunity or concern;
- provide information to support the identification and assessment of core process performance features;
- participate on teams to define and implement process management;
- help mediate boundary disputes;
- ensure that process owners are identified for each process and that the affected individuals have the requisite authority and support needed to manage the process effectively;
- work with benchmarking and customer satisfaction teams to gauge the requirements for each identified process;
- participate in initiatives to analyze and define required improvements in existing process performance;
- ensure that process interactions or hand-offs are clearly identified and input/output requirements are defined in objective, measurable terms;
- monitor the effectiveness of efforts to control process deviations;
- provide financial and nonfinancial results and data to support the effort to design a new process or improve the performance of existing processes; and
- monitor and ensure the integrity of the databases used by process managers and performers.

The financial practitioner provides a unique service to an organization, serving as an unbiased source of information and analysis to guide the design, ongoing management, and reengineering of core, management, and support processes. When a process is deemed to be underperforming, the finance professional should help create a business case that leads to effective resolution of the problem. Whether this entails outsourcing a process to an outside organization or dedicating resources to improve performance, the finance professional provides a critical check on the assumptions and impact of decisions in the process domain. Though seldom asked to directly manage any process outside of the finance area, the financial practitioner is among the list of key players needed to support all process initiatives.

IX. STAGES IN IMPLEMENTING
Several key features are present in any organization that has effectively institutionalized process management:

- a mapping that documents the steps in the process and the functions that perform them;
- a set of customer-driven measures tied to organizational strategies and metrics and used to define functional performance requirements and measures;
- clear process owner(s);
- a permanent process team that meets on a regular basis to identify and implement process improvements;
- an annual business plan defined for each core process; it includes details on expected results, objectives, the financial budget limits, and nonfinancial resource needs;
- targeted tools and techniques to support the ongoing monitoring of the process on key performance dimensions; and
- use of procedures (such as root-cause analysis) and management methods (such as process teams) for solving process problems and capitalizing on process improvement or performance opportunities.
In some organizations, these features have led to process maturity ratings. For instance, Texas Instruments uses a process maturity ranking to understand a subunit’s ability to interface with other units/processes or to achieve optimal performance on key process dimensions. Ford and Boeing use similar devices. For example, at Ford a process is rated on a four-point scale based on its performance on 35 criteria, ranging from the need for a process to have a name and be properly documented through the requirement that the process be deemed by customers to be operating free of defects.

Achieving a high score on process maturity begins with the discipline and logic used to drive the initial implementation. Three stages make up an effective process management implementation initiative:
- process initialization;
- process definition; and
- process control.

Reflecting the underlying characteristics of a process, each of these implementation stages creates a structure, relationship, or control point essential to effective ongoing process management. Various tools and techniques can be used at each stage of the implementation to improve the speed and efficacy of the initiative, creating a repeatable framework that can be applied on a process-by-process basis.

While process management is a total organization concept, its implementation has to proceed logically one or two processes at a time, starting with core processes that directly impact customers and working backward into the inner structure of the organization.
Process Initialization

During the process initialization phase, the goal is to clearly demarcate the boundaries of the process, establish specific ownership for the process and its performance levels, and to tightly define the scope of the process and project. Two primary activities completed at this stage are:

- establishing process ownership; and
- defining process boundaries.

If the process is poorly defined or ambiguous ownership is allowed, the implementation effort ultimately fails to yield required improvements in performance against customer expectations.

Establishing Process Ownership

The first step in implementing process management is to identify an individual or team that will have ongoing responsibility and authority to control the performance of the overall process. Each process has one, and only one, owner. Defining ownership is critical to process management for the following reasons:

- to establish clear accountability for correcting deficiencies and making improvements to an operation;
- to facilitate problem resolution and action taking;
- to resolve jurisdictional issues that may arise; this is especially true of cross-functional processes where the owner may serve as a tiebreaker; and
- to provide the authority to make changes in order to improve its performance on cost, schedule, quality, or productivity dimensions or to enhance the design itself.

One of the most common misperceptions in organizations considering the use of process management is that the process structure supersedes the existing organizational design. Unlike a product or project manager, however, the process owner does not represent a second organizational structure. In effective process management, reporting relationships remain vertical; the functional managers retain their power. The horizontal dimension is added if the functional managers are judged by their departments’ contribution to one or more processes and if process owners ensure that interface problems are resolved and that process considerations dominate functional interests. There is one more distinction between a process owner and a product or project manager: products and projects come and go; processes are permanent.

Given the pivotal role played by the process owner, it is important that the individual meets most if not all of the following criteria:

- holds a senior management position;
- holds a position that gives him or her major equity in the total process (the most to gain if the process succeeds, the most to lose if it fails);
- manages the largest number of people working in the process;
- understands the workings of the entire process;
- has an overall perspective on the effect the environment has on the process and the effect the process has on the business; and
- has the personal ability to influence decisions and people outside his or her line-management responsibility.

Regardless of who is ultimately chosen to be the process owner, it is critical that these responsibilities be unambiguously assigned. Lack of accountability can paralyze action taken to correct work-related problems, often leading to inef-
eficiency, poor morale, and dissension among both employees and management. Ownership ambiguity is often the result of process complexity, problems within the organization’s structure, cultural constraints, or the styles and attitudes of its key managers.

Regardless of the cause for ambiguity, it must be remedied. While it may be challenging to identify the optimal “owner” for a complex process, it is a critical effort that is even more important when diverse functional or geographic boundaries must be spanned by the process. If necessary, senior management may need to assign the responsibility and authority needed to ensure effective process functioning. If they fail to do so, it is quite likely that senior management will need to become actively involved in mediating problems that escalate, due to the lack of a clearly defined point-of-authority in the process. Exhibit 6 details the definition of process management roles and responsibilities at GTE Telephone Company.

As Exhibit 6 suggests, GTE has put a significant investment of time and effort into defining a process management structure that minimizes ambiguity and optimizes both short- and long-

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**EXHIBIT 6. GTE TELEPHONE PROCESS MANAGEMENT ROLES AND RESPONSIBILITIES**

<table>
<thead>
<tr>
<th>Process Executive</th>
<th>Process Panel</th>
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<tr>
<td>Champions process management</td>
<td>Provides alignment across subprocesses</td>
</tr>
<tr>
<td>Formulates process vision</td>
<td>Integrates process improvements cross-functionally</td>
</tr>
<tr>
<td>Champions process across enterprise</td>
<td>Reallocation of resources to fund action plans</td>
</tr>
<tr>
<td>Identifies critical process business issues</td>
<td>Provides clear line of sight to customer needs</td>
</tr>
<tr>
<td>Balances process focus/functional focus</td>
<td>Links subprocesses’ performance to process performance</td>
</tr>
<tr>
<td>Processes performance measures/targets</td>
<td></td>
</tr>
<tr>
<td>Allocates/reallocation of resources/capital</td>
<td></td>
</tr>
<tr>
<td>Appoints/supports process champions</td>
<td></td>
</tr>
<tr>
<td>Approves gap closure plans</td>
<td></td>
</tr>
</tbody>
</table>

**Subprocess Champion**

- Identifies critical subprocess business issues
- Defines scope of project
- Creates permanent process team
- Serves on process panel
- Champions subprocess/team
- Manages white space of process/subprocess
- Provides team award/recognition

**Process Team Leader**

- Plans for each process
- Creates quantum leaps for processes
- Advocates/maintains enterprise processes
- Links with continuous process improvement teams
- Coordinates long-term vision and migration

**Permanent Process Team**

- Brings subject matter expertise to team
- Conducts root-cause analysis
- Designs improvements and measures
- Develops/recommends process improvements/gap closure ideas
- Maintains/process documentation
- Advocates/maintains process focus throughout the enterprise

**Facilitator**

- Manages team logistics
- Facilitates group meetings
- Monitors time lines and project schedules
- Mediates interpersonal conflicts

**Scribe**

- Documents team meetings
- Maintains project plan
- Distributes minutes and progress reports
- Coordinates formal communications

term performance opportunities. The use of a process panel to coordinate processes reflects a key learning of process-based organizations: If the relationship between processes is not actively managed a new form of “white space” can be created—between processes. Since no one process can meet the totality of a single customer’s needs, it is as dangerous to have between-process gaps as it is to have functional silos in place. In either case organizational responsiveness is reduced and miscommunication occurs.

Also apparent in Exhibit 6 is the degree of senior management commitment needed to ensure the success of the process initiative—without senior management support and active participation, process management cannot achieve optimal levels of performance. While every book or article on change management emphasizes the need for senior management support, it is integral to almost every successful process management initiative. The reason for the centrality of senior management in process management lies in the boundary-spanning nature of the technique—individual managers and functions are expected to interact in new ways with new rules of engagement and a blurring of authority at the job level. Is the process owner in charge? Is the functional manager the key player? Such a major change to the definition of authority, responsibility, and objectives within the organization can succeed only if senior management puts the requisite time and resources into the change initiative.

While having one process owner is optimal, it may be necessary to move the organization toward a process orientation by first defining portions of the total process responsibility to managers with clear authority already in place, thus avoiding early jurisdictional disputes that can wreak political havoc on the implementation. In this situation, accountability becomes defined around the output and performance of a specific subprocess. Subprocesses can then be linked through mutual goals, objectives, and performance measures. Conversely, management may facilitate negotiation between the core subprocesses and other parts of the organization to establish required ownership and responsibility structures.

In the end, the goal is to ensure that boundaries are effectively spanned and that functional or personal interests do not impede the functioning of the process. Avoiding ambiguity in ownership will reduce the probability that ongoing political problems and conflict will disrupt the process management initiative. Multitiered performance measurement systems also can be created that provide incentives for individual managers on process performance as well as individual, functional, or organizational outcomes. Adopting organizations such as Caterpillar, Inc. have found that multitiered performance/reward systems can be a powerful tool in overcoming resistance to change and increasing the degree of interfunctional and interunit cooperation.

Defining Process Boundaries
Process boundaries define the limits of a set of activities. Setting a demarcation between the input and output sides of the workflow, process boundaries make it easier to establish clear ownership as well as identify critical interfaces within the process and between the process and its suppliers and customers. Internal interfaces, another form of process boundary, are organizational transition points contained within a bounded process that denote the point where the work output of one activity becomes the work input to the next activity.

Many of the major process performance and flow
problems occur at interfaces. Fumbles, miscommunication, and error are the result of poorly managed interfaces and ambiguously defined customersupplier requirements. Creating a “chain of customers” that links activities and people from the supplier through to the final consumer is the goal. Standing between an organization and attainment of this goal is the identification and effective management of process boundaries.

One useful tool for addressing process boundary and interface issues is the customer-producer-supplier (CPS) model illustrated in Exhibit 7. Premised on the assumption that the output of the process must meet customer-defined requirements, the CPS model was first developed and used by K. Ishikawa, a noted Japanese teacher and developer of quality management techniques.

Three parties are defined by the model: the customer (internal or external) who receives the output of the process, the producer of the output, and the supplier who provides inputs to the producer. Three sequential phases combine to define the process boundaries within the CPS model:

- output requirement phase;
- production capability phase; and
- input requirement phase.

Essential to the use of this model is the development of mutually agreed upon performance requirements for the process. Whether gained through negotiation or by specific customer definition, these requirements drive the definition of the process, its boundaries, and key interfaces.

In the definition of output requirements phase, the management’s goal is to define “acceptable” process output from the customer’s perspective. Striving to reduce unnecessary ambiguity regarding these requirements, the process owners typically employ one or more of the following tools to establish clear and reasonable expectations:

- **Documentation**: Word descriptions, specifications, attribute lists, information flowcharts, or quantitative descriptions of customer requirements can all serve as the basis for defining the process goals.
Specifications: Graphic or quantitative descriptions of product or service attributes can serve to reduce ambiguity and miscommunication by identifying clearly measurable values and tolerances for the affected output. The more precisely a measurement can be established, the greater the probability that the process will satisfy its customers.

Attribute lists: An attribute list details the properties or characteristics that the product or service must satisfy. For instance, one attribute might be an upper limit on allowable cost for the output. To be useful the attribute list should be unambiguously defined around observable features of the product or service.

Information flowcharts: Graphical representation of the flow of data and activities within a process can aid in defining key points where customer requirements are affected. One such chart is presented in Exhibit 8 for an accounts payable function. As the exhibit suggests, activities occur within the circles as characterized by verb-noun combinations, the most common notation used in activity-based manage-
ment. Linking each activity in the chart is a certain form of information, shown in the form of vendor invoices, payment data, or related data elements. What is also interesting is that the information flowchart does not have a linear, hierarchical structure. Reflecting the fluid nature of information, the diagram focuses instead on making the key lines of communication easy to spot and understand. It can also identify where one piece of data is used in multiple activities, providing a visible sign of key interfaces as well as where technology enablers (e.g., networks or enterprise resource planning systems (ERPs) that rapidly provide the same data to multiple users) can improve process performance.

- **Deployment matrices**: As suggested by Exhibit 9, deployment matrices are a structured approach that translates customer requirements into specific features of a product or service. The example in the exhibit develops the concept of service quality, first in terms of its abstract concept (e.g., customers want “good” service). This is elaborated in the matrix as three distinct service attitudes—courtesy, effectiveness, and appearance. Finally, these three service attitudes are expanded to include key drivers of service attitude (friendliness, clean uniforms, etc.) and their relative impact on the three dimensions of service attitude assessed (strong, normal, or weak relationship). Deployment matrices are often used as part of a quality function deployment (QFD) initiative. Their use in process management is especially valuable if they are already part of the accepted toolkit used by the organization to address and understand its operations. Used
predominantly to transform general requirements into specific attributes that help define and direct process activities and objectives, deployment matrices are also useful in pinpointing and supporting quality and cycle time improvement efforts.

Word descriptions, specifications, and attribute lists are the most commonly used types of documentation. Even so, only deployment matrices provide a structured way to translate the often vague requirements of customers into specific operational and technical attributes that can be understood and acted on by the organization. Regardless of its final form, the documentation of process requirements lays the groundwork for the next phase of the CPS model—defining the organization’s production capability.

The production capability phase turns attention toward the process and its ability to meet the defined customer requirements in a repeatable, effective manner. The capacity, cost, quality, and responsiveness of the process are the key features that are measured and compared to defined customer requirements during this assessment. If the process is deemed unable to meet expectations, it needs to be redesigned to improve its effectiveness or a negotiation with customers must take place to change the expectations.

The final phase of the CPS model, defining input requirements, involves detailing the cost, timeliness, quantity, and quality of the goods, services, or information provided by the process’s suppliers. Driven by customer requirements, these input features represent a key constraint on the ability of the process to meet expectations. To achieve effective input management, attention has to be paid to the interface between the target process and its upstream processes and organizations. It is a boundary-spanning effort that results in negotiation, compromise, and final agreement on specific product or service attributes the affected inputs must exhibit.

Matrices prove useful in defining these attributes and creating a means to measure and communicate their importance and required performance level. For instance, Ford Motor Company uses responsibility matrices to denote clearly the roles and responsibilities of support groups and participating functions from a process perspective as shown in Exhibit 10. Focused on gaining service commitments to support the manufacturing line, management uses the matrix approach to communicate needs and secure specific service commitments. A similar matrix was deployed with external suppliers of critical components and services.

Regardless of the tool used or approach taken, the goals pursued during the process initialization stage are to establish clear process boundaries and to define a process owner who can drive the process initiative forward. These two goals must be achieved before moving into process definition and implementation because they provide the necessary structure, both organizationally and politically, to move the initiative forward. Once these two goals are achieved, attention turns toward developing a clear process definition.

Process Definition
Left unattended, most business processes tend to be poorly defined and managed. It is of little surprise, then, that the process dimension remains the weakest, most ineffective aspect of most organizational structures. Clearly defining a process provides the means for both understanding and communicating operational details to persons and functions involved in the process. Process definitions also serve to detail
a performance baseline or standard that can then be used to evaluate process performance and assess the effectiveness of improvement efforts.

Two primary phases or steps take place during process definition including:

- the development of process charts or related documents (defining the process); and
- the establishment of specific customer requirements.

While the customer infuses all process management, it is important to specifically define what is expected, when, where, and in what quantity.

**Defining the Process**

Process definitions can take the form of words or symbols. Word descriptions are often called “standard operating procedure,” and comprise lengthy, detailed descriptions of how a specific activity or process should be completed. While common in many organizations, word descriptions can be difficult to write, communicate, and use. Reflecting the fact that “one picture is worth a thousand words,” the preference in most organizations is for symbolic process flow definitions. Word descriptions, such as those used for ISO certification documentation, serve to back up or elaborate on flowcharts.

Defining a process entails the completion of several steps that are best completed in the...
following sequence:

- Establish the beginning and end of the set of activities or process to be defined. These are the key boundaries or interfaces with suppliers and customers. On the output side it is often useful to separate “changed” output from “unchanged” output. Unchanged output is used to coordinate processes. A list of bids from suppliers would be an unchanged output. Once obtained, it is used in several parts of a procurement process, but the list is unchanged by who uses it or how often it is accessed. Fumbles and miscommunication are the result of poor management or flow of unchanged outputs.

- Changed output is altered or created by a process. The majority of errors in a process occur during the transformation of materials or information from one form to another. In diagramming a process, unchanged output serves to link process activities horizontally, while changed output should be represented with a vertical arrow that links the process steps to each other or the process to its customers.

- Use information and direct participation from people involved in the process, documenting the major activities that connect the beginning and end of the process. In the early phases of process definition, care has to be taken to minimize the detail incorporated in the process flowchart. Two steps should be followed during the charting effort to ensure that the resulting flowcharts are defined at the right level of detail:
  
  ✓ First, define the set of activities that make up the workflow at the macro level. At the macro level the emphasis is on identifying the groupings of activities where key transformations occur. Several activities are usually contained within each primary process block as shown in Exhibit 11.
  
  ✓ Second, detail the activities that make up each process block. Care must be taken to avoid going to the task level of detail. For example, time-stamping an invoice is a task performed to complete the activity “enter invoice data” in the data entry box of the accounts payable process.

In the language of process mapping, Level 0 flowcharts contain only top-level macro activities and transformations within the process flow, while Level 1 charts depict the major activities making up the macro, or process block. Level 2 or higher flowcharts break activities into tasks and, finally, actual steps in the completion of these tasks.

The right level of detail to employ in a flowchart depends on the use being made of the flowchart. Excessive detail is to be
EXHIBIT 12. PROCESS FLOWCHART SYMBOLS

<table>
<thead>
<tr>
<th>ASME Symbol</th>
<th>Name</th>
<th>Activity Represented</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Transformation or modification operation</td>
<td>Modification or any change at all (changing shape or size, machining, permanent assembly or disassembly, etc.) of product at one workplace. Modification may be accomplished by machines and/or labor expenditure and does not necessarily add utilitarian value to the product.</td>
</tr>
<tr>
<td></td>
<td>Move</td>
<td>Change in location of product from one workplace to another</td>
</tr>
<tr>
<td></td>
<td>Temporary storage/delay</td>
<td>Delay and waiting of work in process</td>
</tr>
<tr>
<td></td>
<td>Verification</td>
<td>Comparison of product with a standard of quantity or quality</td>
</tr>
<tr>
<td></td>
<td>Inspection</td>
<td>A control point established by management action</td>
</tr>
<tr>
<td></td>
<td>Storage</td>
<td>Store of raw or finished material</td>
</tr>
</tbody>
</table>

Source: adapted from G. Nadler, 1970: 47.
avoided unless specific aspects of the process have been identified and targeted for improvement. Detail can hide key transformations and the movement of the materials and information through the process, making it difficult to identify problems and improve communication and performance.

- Develop the flowchart using the symbols illustrated in Exhibit 12, incorporating their sequence of occurrence. If the product or service must be moved physically between activities, a “move” arrow is used to connect activities. If no physical move is needed, a simple line is used to connect activities in the flowchart. Often process performance metrics are attached to the flowchart, reflecting the distance of the move, the time required for completion of the activity, or other key factors that have an impact on the effectiveness of the process and the quality of its inputs and outputs.

- Verify the steps, sequence, and key aspects of the process flowchart to ensure that it reflects the underlying workflow accurately, including information requirements and transformations. Specific questions that can be used at this stage include:
  - Does each identified process have an identified information “bit” (input or control) that causes work within the process to begin? Does it have a defined owner? Does it produce some output?
  - Are all processes linked to other processes?
  - Are processes linked to each other only at the same level of detail? Level 1 flowcharts should be linked only to other Level 1 charts, and so on.

Symbolic representations of workflows make it easier to visualize and analyze the characteristics of a process. Using a standard set of symbols captures the six basic activities that can occur in a process: the work itself, output verification, movement, storage, inspection, or delay.

In some cases, it is easier to use the symbols developed for information flowcharting to reflect the basic structure and dynamics of a process: the rectangle and the diamond. The rectangle describes a conversion process while the diamond identifies a control activity, such as an inspection point where product may be rejected and sent to rework. If decisions need to be made within a process, as is usually the case, it is necessary to incorporate some form of symbol or notation to identify these critical events clearly in the workflow.

Process flowcharts are an invaluable tool for creating a process mindset and communicating the nature and overall performance of the process against customer requirements. A tremendous amount of learning takes place as the flowcharts are completed. It is often the first time that internal suppliers and customers discuss what they do, how, and the impact of each others’ efforts on overall process capability. Obvious weaknesses in the process can be spotted once the flowchart is completed, providing the basis for early improvements that can put momentum behind the process management initiative.

In the end, the process and the evaluation of its effectiveness depends on understanding customer requirements. Whether the customer is internal or external to the organization, a consumer, trading partner, or member of the board of directors, knowing what is expected, when, where, and why, is the key to keeping unnecessary activity, cost, and waste out of a process. Customer requirements define the “value” added by a process.
Establishing Customer Requirements

One of the most important yet difficult parts of any process management initiative involves developing a clear list of customer requirements. Often vague in initial statement, these preferences must be translated into specific, achievable goals, objectives, and measures if they are to be useful in driving process performance. Once the domain of marketing alone, today defining and using customer requirements should be an integral part of the objectives and efforts of every function, every process, and every manager.

One of the most common ways to define customer requirements is through some form of survey instrument, such as a focus group, administered survey (phone or in person), or mailed survey. It can be difficult to identify specific product or service requirements—opinion and satisfaction levels are often the outcome of customer surveys. The goal is to understand what product or service features customers require to be satisfied, and in what quantity.

Focus groups and other forms of qualitative data collection increasingly are being used to identify which specific product/service attributes are most valued by customers. Once these attributes are identified, further information on their importance to various customers can be gathered using one of several statistical approaches. These models help an organization rank the attributes and assign weights to them based on how important they are to the final purchase decision.

For instance, during a focus group a customer might be asked to identify the six to eight attributes or features that a computer should have. The attributes might include processing speed, price, memory, ease of use, amount and type/quality of software included, type of operating system, service/warranty features, and the level and quality of post-purchase support (e.g., help desk).

When asked to assign the amount of value to these attributes out of $100 of purchasing cost, one customer might provide the following information:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Assigned Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processing speed</td>
<td>10</td>
</tr>
<tr>
<td>Price</td>
<td>25</td>
</tr>
<tr>
<td>Memory</td>
<td>10</td>
</tr>
<tr>
<td>Ease of use</td>
<td>20</td>
</tr>
<tr>
<td>Amount/type of software</td>
<td>15</td>
</tr>
<tr>
<td>Operating system</td>
<td>5</td>
</tr>
<tr>
<td>Service/warranty</td>
<td>5</td>
</tr>
<tr>
<td>Post-purchase support</td>
<td><strong>10</strong></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

This information provides a company with the value profile for this specific customer. If the organization is to provide the greatest amount of value for this customer, it will distribute its spending on the design, capabilities, and support of its computers to reflect the customer’s preferences. A review of the attributes and weightings would suggest that the user is probably not a sophisticated user and may be looking for an inexpensive computer to gain access to basic services, such as the Internet. A more sophisticated user would be expected to put a higher weight on processing speed and memory, with far less concern for ease of use and the software provided by the manufacturer.

While every customer would be different, recent work in business strategy suggests that these profiles cluster into defined customer value segments. Once the value attributes are defined for a product or service, any number of statistically reliable data collection methods can be used to
gather data on the distribution of value profiles within the targeted customer population. The results of these analyses provide a means for linking processes and process output features to defined customer requirements and for assessing the effectiveness of the organization’s activities and spending in these areas.

Customer requirements serve to separate value-add from other forms of cost and activity with a process. Value-add is an adjective that takes on meaning only when the customer’s preferences are known—it is not an internal “feel good” concept, but rather identifies those activities and processes that directly affect customers. Other activities may be important to support direct value-add efforts, such as accounts receivable. Here an error or miscommunication may irritate a customer, but the customer will not directly place value on this work. Still other activities and processes are important to support the future ability of the organization to compete in the market. Once again, today’s customers may not place value on these efforts, but they are essential to the organization.

Viewing the organization from the customer’s perspective provides management with the focus and ability to prioritize improvement initiatives that often can be lacking in process management initiatives. One measure of the success of process management is that overall customer satisfaction with the organization’s products and services increases—it should help an organization create more value for customers, be more responsive to their needs, and waste fewer resources than is possible in a non-process-based organization.

Having identified customer requirements and assessed how well they are being met by the existing organization, attention can turn to the third and final phase of process management, process control.

**Process Control**

Process control consists of four steps:

- establishing points of control;
- measuring/assessing the process;
- performing feedback and corrective action; and
- ensuring continuous improvement.

There is a logical sequence to control. Before corrective action can be taken, measurements must exist to serve as a basis for that control. In turn, for certain types of measurements to be made, control points must exist. Establishing points of control is, therefore, fundamental in managing processes.

**Establishing Control Points**

A control point is defined as a step or steps in the workflow associated with actions such as checking, inspection, auditing, physical measurement, or counting. Information obtained at a control point can be used to interrupt the workflow due to nonconformance to quality or customer standards or to improve process performance. A process that lacks clearly defined control points will be capable only of reacting to problems—not proactively preventing them. It is much more costly to repair a problem than it is to find ways to prevent it from happening.

Control points can be used to accomplish any number of objectives, including:

- identification of key process or activity constraints;
- definition of the condition(s) leading to activation of a process or activity within a process flow;
While it might seem that a well-designed process should not require extensive use of control points, it is control that ensures effective operation of the process. Controls exist to keep the process on track, performing as needed against defined customer requirements. Control in this setting is not punitive in nature—processes, not people, are the focus of the measurements and verifications. Effective processes are the result of the establishment of good control points, not the converse. Key steps required to achieve compliance within a process are illustrated in Exhibit 13 and described below.

- **Set the policy or standard to be complied with:** This standard can be based on external regulations, such as ISO requirements, internal quality standards, or a benchmark-based objective or definition of performance. The goal is to determine which regulations and standards are appropriate and how compliance is to be assured.
- **Establish organization:** Using technology enablers or structural elements of the process, the operational framework for ensuring compliance needs to be developed. Where are control points to be placed? Who is to have responsibility for monitoring and assessing process performance against standards? Effective compliance structures normally place responsibility for ensuring the process meets its performance requirements with one person—the process owner.
- **Develop procedures and codes of practice:** Documenting what activities must be completed, in what order, and at what level of reliability and quality is an essential part of creating an enforceable compliance structure. One of the lessons learned by companies from the ISO certification effort is that poorly documented processes are seldom under control. Gaining control requires understanding what needs to be done for the process to work at its optimum, then defining the rules and regulations that will ensure this level of performance is reached.
- **Check for compliance:** Once rules and regulations are in place, the process has to be assessed for its degree of compliance to these requirements. The review at this stage serves two purposes. First, it helps identify areas in the process where existing procedures will lead to downstream quality and performance failures. Second, it helps refine and revise the procedures and regulations to ensure that they are logical and consistent with the process and its capabilities. If compliance violations are found, the compliance effort returns to the previous step, where new procedures and regulations are developed to eliminate the problems. The iteration that naturally occurs between developing procedures and costs of practice and checking for compliance results in an evolving set of process documents that ultimately meet both the needs of the organization and the requirements of its customers and other external parties.
- **Train staff:** Once the procedures have been defined, it is important to train the process performers. Serving as the first step in imple-
menting the conformance standards and methods, training serves to increase the probability that the methods will be accepted because people can see how their own jobs are affected as well as the impact of their efforts on overall performance of the process. In addition, training often turns up new areas where compliance problems may occur either due to the nature of the regulations themselves or overlooked process issues that may make reaching conformance standards impossible.

- **Execute procedures**: Once training is complete, the new procedures can be put into effect. This should be a nonevent for the organization if the previous steps have been adequately completed.

- **Monitor and improve performance**: While executing the procedures should be relatively straightforward, it is important that an ongoing monitoring program be developed to ensure that the defined standards are adhered to and that any new process problems are identified as soon as possible. In addition to the use of feedback loops as shown in Exhibit 14, compliance audits can be conducted to monitor and improve process performance.

A compliance audit is a review that seeks to identify areas where the organization’s processes fail to meet customer or user requirements.
Two specific types of checks are made during the audit process:

- Operational processes are examined to ensure that they contain no direct contradiction, or violation, of defined process procedures and standards.
- Process procedures and standards are reviewed to determine how they are actually applied within the process to identify areas where procedures may need to be modified.

A number of compliance violations commonly occur in processes, including control violations, ownership violations, information inadequacy or errors, poorly or incorrectly specified processes, or incomplete process definitions. These compliance violations need to be addressed as soon as they are identified as they reduce the effectiveness of the process and increase the probability that it will not meet its defined customer or organizational performance requirements. Added to the list of issues reviewed during an internal control audit, the conformance audit seeks to improve the process—it is not punitive in nature. Once compliance problems are found, the process should be redesigned to eliminate them, procedures should be changed if they are not effective or appropriate, or additional training should be undertaken to help process performers improve their ability to meet the standards.

Achieving compliance is not always a straightforward exercise. Differences of opinion or conflicts of interest can occur during the definitional stage. Often the experts defining process requirements are using their opinion of what a specific external regulation or customer need means for a process—the vagueness of the source or reason for the standard can create disagreements and controversy over what process features and regulations should be put in place. In other situations, multiple requirements can
result in contradictory process demands. In this case, the organization has to choose a compliance approach that will meet the more critical of the demands and not result in undue violations of secondary requirements.

Judgment and compromise are essential ingredients in the design, implementation, and audit of process conformance. Seeking continuous improvement, not perfection, the goal is to constantly reduce the waste created by the process by removing the cause of errors and

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EXHIBIT 15. CUSTOMER SERVICE CONFORMANCE CHECK SHEET

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Tally</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Customary courtesy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td></td>
<td>15</td>
<td>60</td>
</tr>
<tr>
<td>Neutral/absent</td>
<td></td>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td>Negative</td>
<td></td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td><strong>Responsiveness</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Above average</td>
<td></td>
<td>12</td>
<td>48</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td>10</td>
<td>40</td>
</tr>
<tr>
<td>Below average</td>
<td></td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td><strong>Customer helped?</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td>19</td>
<td>76</td>
</tr>
<tr>
<td>No</td>
<td></td>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td><strong>Said &quot;thank you&quot;</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td>22</td>
<td>88</td>
</tr>
<tr>
<td>No</td>
<td></td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td><strong>Perceived customer satisfaction?</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very satisfied</td>
<td></td>
<td>8</td>
<td>32</td>
</tr>
<tr>
<td>Satisfied</td>
<td></td>
<td>11</td>
<td>44</td>
</tr>
<tr>
<td>Neutral</td>
<td></td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>Dissatisfied</td>
<td></td>
<td>2</td>
<td>8</td>
</tr>
</tbody>
</table>

nonconformance. Process control is an evolving, dynamic activity facilitated by the use of effective measurements.

Measuring/Assessing the Process

Measurements are an integral part of effective process management. They are needed to identify and determine process error rates, translate customer requirements into specific process features, and ensure conformance to process standards. Several general types of measurements can be used in process settings:

- conformance metrics;
- responsiveness measures;
- measures of service level;
- measure of repetition or reliability of the process;
- cost measures; and
- complexity measures.

Conformance metrics emphasize the degree to which the output of a process or activity meets expectations. Normally an inspection or verification is completed to assess conformance. Conformance metrics include comparisons of the physical dimensions of a part or product to specifications, trending of defects over a specified period (e.g., piece parts per million), or the functionality of the output. Exhibit 15 illustrates conformance metrics for a customer service activity.

Three situations can occur once nonconformance is identified through the use of a conformance metric:

- work is accepted as is;
- work is rejected and returned to the producer; and
- work is accepted by the customer and modified to conform to the desired state or condition.

When nonconformance is identified, it signals that the process is out of control. The cause of the performance problems needs to be identified and new process controls developed to eliminate the variation and error from the process.

Responsiveness metrics focus attention on the time elapsed from the original request or activation of the process until the request is met. Throughput time is a measure of the responsiveness of a physical process, focusing attention on how long it takes to complete one unit of product or service. In other cases, an external measure of process performance against standards is used, such as Federal Express’ guarantee that priority shipments will be received by 10 a.m. of the following business day.

As the throughput time of a process is reduced, its inventory and resource buffers are also decreased. Since buffers are nonvalue-added resources and costs, their elimination improves the efficiency and cost performance of a process. Motorola has used responsiveness metrics quite effectively to improve process performance.

For example, one comprehensive process being used at Motorola is cycle time management. While primarily a manufacturing term, cycle time can be applied to service tasks. All administrative and staff functions at Motorola are working on cycle time reduction with success. The patent department, for example, has reduced the time it takes to file a patent from as much as two years to fewer than 90 days by getting patent attorneys involved with engineering, business, and marketing people early in the process.

Cycle time measures are often used to capture the responsiveness of a process, as is the length of time between a customer’s request for
a service or product and its delivery. The speed at which requests for changes in a product by a customer can be incorporated can also reflect the responsiveness of the organization. In an era when customers continue to expect more quality, more responsiveness, and more customization to their specific needs, the ability of an organization’s processes to meet these evolving requirements quickly may define the difference between competitive success and failure.

Measures of **service level** capture the availability of a process to its users. A company that offers a 24-hour help line is defining a key process performance requirement—continuous operation under all conditions. In other cases, the metric may emphasize the length of wait before a customer request is responded to, such as the goal that all calls should be answered within three rings in a customer service center. Being available when needed, and with the level of quality or capability expected, is a key measure of process effectiveness.

Some customers have come to place heavy emphasis on service level in their set of supplier requirements. For instance, a customer might require that an employee of the supplier be in the customer’s plant on a daily basis to help respond to process and product problems. Companies such as Caterpillar have found a way to differentiate themselves based on service level—Caterpillar will deliver a replacement part for any of its equipment anywhere in the world within 24 hours.

**Repetition measures** emphasize the reliability of a process—its ability to create the same level and quality of output over time. For instance, cycle time measures of a manufacturing or service process capture the repetitiveness of the process. Variations in cycle time would indicate process variability that may lead to performance failures. Another measure of repetition would be the number of times a document or data is reentered in a system or the number of design iterations before an acceptable design is identified. As can be seen, repetition metrics can detail either the level of control or reliability in a process or focus attention on where the output of repetitive activities is unreliable or erratic.

Cost metrics are the final category of measurements that can be used to assess process performance. These measures direct attention toward the economic impact of waste, poor quality, process variation, and related events on the total resources consumed by a process. The cost of quality is one set of cost metrics often used to evaluate a process. The balance of prevention, detection, internal failure, and external failure costs are a good indication of process reliability and the potential for cost improvements. One dollar of prevention cost can help an organization avoid $5 to $10 (or more) of downstream detection or failure costs. Relatedly, $1 of measured external failure cost actually translates to $10 or more of lost revenue in the future as customers “vote with their feet” when expectations are not met—telling others of their problems as they depart.

Exhibit 16 details a number of potential measurements that could be used in a service or administrative process. In manufacturing, similar measurements would emphasize the cost of quality (prevention, appraisal, and nonconformance), cost per minute of cycle time on the bottleneck, yield, lead-time, schedule attainment, and scrap.

In the end, the measurements chosen should be timely, meaningful to process participants, accu-
rate, and useful. Several guidelines can be used to help an organization in identifying sound process measures:

- Determine exactly what aspect of the process should be controlled—the critical success factors for the workflow.
- Examine existing databases for measures that are currently being used by the organization or process participants to control or manage their work. Measures drive performance and should be added with care to any process.
- If no measurement is currently available, can a business case be made for deploying new metrics or data collection techniques?
- For each measurement chosen, what type of data collection should be used? What are the best sampling method, sample size, and measurement frequency for the given metric? Can technology enablers simplify the data collection and analysis for the process?

A features chart can be developed to ensure that the process metrics chosen are well-defined and reliable as illustrated in Exhibit 17. The chart should detail the process step where measurement is to take place, the key control parameters, unit of measure to be used, the frequency with which measurement and reporting is to take place, and the benchmark or standard used to evaluate current performance. When directly attached to the process flow-chart, a features chart can provide a central source of measurement and process performance requirements that can be accessed and evaluated by process owners, management, or process performers.

*Complexity measures* emphasize the basic nature of the process and how difficult it is to enact a process change or complete a process activity. The complexity index is often used to

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**Exhibit 16. Examples of Process Performance Measures**

1. **Accounting and finance**
   - Accounting report errors (by type and quantity)
   - Number of reports issued after due date (% per month)
   - Number of account reconciliations per month
   - Number of lost discounts per month
   - Payment error rate
   - Billing errors per month by error category
   - Number of defective vouchers per reporting period
   - Clock card or payroll transcription errors
   - Ledger reruns (time and frequency)
   - Deviation of predicted budgets from actual
   - Payroll errors (number per month by type)

2. **Administrative**
   - Employee turnover and transfer rates
   - Number of safety violations (per month by type)
   - Response time to inquiries
   - Typing errors (per month by type)
   - Keypunch or data-entry errors (per month by type)
   - Time spend in locating filed material
   - Filing errors (per month or quarter)
   - Internal mail delivery time (average turnaround time by month)

3. **Computer center services and programming**
   - Computer outages (time and frequency)
   - Job turnaround time
   - Number of program runs to a successful compile/test
   - Number of coding errors in inspection and test
   - Program error resolution time
   - Number of documentation errors

4. **Engineering**
   - Number of engineering change releases (per month by type)
   - Success rate in meeting product schedules
   - Response time to bid requests
   - Adherence to contract budget
   - Number of change requests due to design errors discovered in manufacturing and field
   - Design errors found in release packages

5. **Field service**
   - Number of repair callbacks (per month, by type)
   - Response time to service requests
   - Response time to spare parts demand
   - Time to repair (by type of repair)

Source: adapted from Melan, 1993: 71.
gauge this process feature. It is defined as:

\[
\text{complexity index} = \frac{\text{complexity of the process}}{\text{number of process steps}}
\]

where complexity of the process is the product of

\[
\text{(number of process steps \times number of options per step)}
\]

each time the process allows for multiple outcomes or variations at any one stage in the flow, its complexity increases significantly. Variety, though, is an essential requirement in a global market. The key is not to eliminate the ability to provide variety to customers but rather to find ways to eliminate the impact of variety on the process—to remove the visible or procedural effort required to absorb product variety.

The later in the process that variety occurs, the less it affects overall process performance. At Western Electric the recognition that its core product, a telephone, was not functionally defined by color meant that “generic” phone sets could be inventoried with color (e.g., the plastic cover) added once an order was received. This change reduced the total cost of inventory for the organization while at the same time increasing its responsiveness to shifts in customer requirements.

When measuring a process, it is critical that multiple dimensions of performance be captured. Creating a balanced scorecard at the process level usually entails defining expectations in terms of quality, delivery, cost, and productivity. If only one dimension of performance is measured, skewed outcomes can occur as people focus undue attention on one element of performance at the expense of other, equally important features. The goal is to ensure that all product and service requirements are met. This requires a complete set of measures that capture all key performance dimensions.

In the end the measures chosen should be output-driven, customer-focused, and should
incorporate the critical dimensions of performance for the process. A standard should be developed for each measure to ensure that the demands of all of the organization’s stakeholders are met on a consistent, reliable basis—that deviations are noted and controlled.

Performing Feedback and Corrective Action
Controlling process deviation is so important that a large number of tools and techniques have been developed to ensure it is minimized. The most common of these tools is the Shewhart control chart, which is used as a basis for statistical process control (SPC). Here, samples of output from a process are measured against key parameters and then charted over time to determine process variation. Once an output falls outside the acceptable range of performance or feature (e.g., physical dimensions), the process is shut down and remedial action taken. Pareto charts are also commonly used to identify the key sources of process variation. Exhibit 18 provides examples of both types of charts.

Any number of errors can be the focus of the metrics used to control process deviation, including incomplete output or information and inconsistent performance. When used in the early stages of process definition, these process deviations can serve as vital information on where improvements are needed. For instance, if information is required at one stage of the process but the source of the needed data cannot be identified, an incompleteness error will occur once the process is initiated. In a related way, if the performance varies widely on a key metric such as quality, it needs to be addressed immediately to avoid customer dissatisfaction. These features of a process serve to underscore the value of process management for an organization. Whether manufacturing or service, large or small, an organization that seeks to improve its performance against customer expectations needs to put process management concepts to work to reduce variability and improve the effectiveness and efficiency of its efforts.

Ensuring Continuous Improvement
In the global market, standing still once processes are put in place is not an option. The ongoing search for ways to improve process performance against customer expectations has to be an integral part of the process management initiative. Four specific types of change are relevant to processes:

- changes in the quantity, quality, or related aspect of the process’s primary inputs and outputs (e.g., a change in customer expectations);
- changes in time, such as the cycle time required to complete a process step or the total throughput time for completing a specific product or service;
- internal changes to the process as the result of continuous improvement, reengineering, quality initiatives, or related sources; and
- imposed changes in the external environment, such as new regulations, shifts in the competitive environment, macroeconomic changes, or other uncontrollable events.

Internal changes to improve process performance should be the result of one or more of the following considerations:

- a study of the flow of the process;
- determination of where waste exists in the flow of the process;
- consideration of ways in which rearrangement of the process will result in more efficient operation;
- analysis of the smoothness and degree of variation in the process flow, looking for ways to
use technology, rearrange equipment, or change the transport system to gain improvements; and

- determination of whether everything being done within the process is really necessary and removal of superfluous tasks that do not affect process performance.

A good process design should readily accommodate these types of change. Ongoing examination of the process, identification of areas where improvements will increase efficiency or effectiveness, and the constant elimination of waste and excess resources enable an organization to stay ahead of the unavoidable pressures to
## Exhibit 19. Process Adaptability Checklist

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description/Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input capacity</td>
<td>Can the process deal with its inputs quickly enough so that it does not get jammed?</td>
</tr>
<tr>
<td>Adaptable input capacity</td>
<td>Can the process accommodate small variations in the volume of input without needing to change the process?</td>
</tr>
<tr>
<td>Output capacity</td>
<td>Can the process produce outputs quickly enough to supply other processes in the supply chain?</td>
</tr>
<tr>
<td>Adaptable output capacity</td>
<td>Can the process accommodate small variations in the volume of output without needing to change the process itself?</td>
</tr>
<tr>
<td>Synchronization</td>
<td>When two processes need to work together to produce a result, have they been designed to be activated at the same time or by another signal?</td>
</tr>
<tr>
<td>Parallel working</td>
<td>Can steps that currently are done sequentially be changed to work in parallel?</td>
</tr>
<tr>
<td>Unbalanced flow</td>
<td>Does a process produce outputs faster than they can be consumed by another process or placed into planned storage?</td>
</tr>
<tr>
<td>Base-lining a process</td>
<td>Before a process is changed, is it well enough understood so that the effects of change are clear and that it will be possible to measure those effects?</td>
</tr>
<tr>
<td>Feedback loop</td>
<td>For all major processes, are clear feedback loops provided, so that information about changes are fed back and used to “tune” the process?</td>
</tr>
<tr>
<td>Production improvements</td>
<td>Could changes be made to the process to reduce the cycle time, cut down the distance which materials or information need to travel, decrease the number of steps, reduce the cost of production, decrease the lead time for modification or new products, or other improvement which could improve efficiency or competitiveness?</td>
</tr>
<tr>
<td>Inspection improvements</td>
<td>Can the process be redesigned to minimize the number of inspection steps or improve their effectiveness? Alternatively, can inspection be reduced or eliminated by incorporating it into process steps?</td>
</tr>
<tr>
<td>Avoiding redundancy</td>
<td>Can the process be redesigned to eliminate unnecessary duplication? Is there any unnecessary copying or storage of information? Are the same operations being carried out by more than one process?</td>
</tr>
<tr>
<td>Process adaptation</td>
<td>Is the process sufficiently adaptable and flexible so that it can be rapidly changed if external conditions change?</td>
</tr>
<tr>
<td>Empowerment</td>
<td>Are process owners sufficiently empowered or given the requisite flexibility and authority to adapt processes to changing conditions?</td>
</tr>
<tr>
<td>Red tape</td>
<td>Is the complexity index as near to 1 as possible so that there is neither too much red tape nor too little guidance on how to carry out tasks?</td>
</tr>
</tbody>
</table>

reduce costs that are part of a maturing competitive market.

Four specific design features can improve the ability of a process to adapt to a changing environment or shifts in internal or external performance expectations:

- **Process balance**: Ensure that all aspects of the process are kept in balance, so that a change in any one area can be easily accommodated by other activities and elements.
- **Flow process analysis**: Ongoing analysis of processes for inefficiencies, wasted effort, or poor material transfer or storage should be an integral part of the design of the process and its control mechanisms.
- **Simplicity**: The more complex a process is, the more difficult it will be for it to adapt to changes in its internal or external environment. Fewer linkages, less interdependence, and minimal variation-producing variety are all key design goals.
- **Adaptability**: The process should be designed for empowerment and process feedback to ensure that it can adapt as required to changing conditions.

Exhibit 19 summarizes the types of changes a process needs to be able to accommodate, providing a checklist for the process design team.

This checklist serves as a means to examine a process design and to evaluate an existing process for potential improvements. Benchmarking can often provide valuable insight into areas where the process is not performing as well as it might, creating an impetus for change that can help speed the improvement process.

Guided by the design principles noted above, process improvement efforts must be an integral part of process management. Understanding what to change, when, where, why, and how is the key to keeping ahead of the competition and abreast of changing customer requirements.

**X. CONCLUSION**

Process management is rapidly emerging as the “hot spot” of business. Focusing attention on how value is created for customers, process management seeks to span functional and organizational boundaries in the search for optimal balance, stability in the process flow, adaptability, and responsiveness. Whether consciously managed or not, the process dimension is a very real part of the overall structure of the organization. Well-managed processes can be relied on to provide ongoing competitive advantage. Poorly designed and managed ones can result in competitive performance gaps that cannot easily be overcome.

Process management is an ongoing effort. It is never completed, never stable. Part of the dynamic mix of market forces, internal capabilities, changing technologies, and shifting definitions of acceptable performance, process management is the key to creating a learning organization that can thrive in a turbulent environment. Process management is a mindset, a culture of cooperation and improvement, that leads to quantum leaps in performance. Gaining the skills to become a process organization is not an option—it is part of the basic survival kit for any organization seeking to gain and sustain a viable place in the global market.
GLOSSARY

BUSINESS PROCESS REENGINEERING. Same as process reengineering; the application specifically refers to business processes rather than manufacturing processes.

BUSINESS VALUE-ADDED ACTIVITY. Any business activity or subprocess that is essential for conducting business but that does not add value from the customer's perspective.

CYCLE TIME. The amount of time it takes for a certain process to complete a job.

DESIGN OF EXPERIMENTS. A technique for identifying the optimum process-performance conditions in situations where two or more variables that are related to that process can be manipulated.

FAILURE ANALYSIS. A systematic approach to identifying, anticipating, and heading off potential problem areas and weaknesses in certain process configuration before it is deployed.

INFRASTRUCTURE. Includes the facilities, technology, systems, and equipment that are needed to support the business process but that are not technically a part of the process itself.

NONVALUE-ADDED (NVA) ACTIVITY. Any business activity or subprocess that the customer does not need or is not willing to pay for or that does not fulfill a business requirement.

PROCESS CAPABILITY. Describes what a process, as it is designed and normally operated, is capable of producing, in contrast to what is desired. A process could be in control but, due to its design, incapable of staying within the desired tolerance limits.

PROCESS EXPERTS. Persons who have specialized knowledge of a certain process. A process expert appointed to serve on the reengineering project should also have broad knowledge of the overall process.

PROCESS FLOWCHART. A diagram that depicts the flow of information, paper, or other work products from one subprocess or activity to the next throughout the process. Also referred to as a process map.

PROCESS OWNER. The person who has end-to-end responsibility for a certain business or manufacturing process.

PROCESS PERFORMANCE MEASUREMENT SYSTEM (PPMS). A systematic approach to monitoring the performance of a process; specifies what to measure, the basis for interpreting these measurements, and perhaps the thresholds that trigger a certain response.

PROCESS PERFORMANCE METRICS. Indexes that are measured in order to characterize the before and after performance of the reengineered process.

PROCESS REENGINEERING. An approach to analyzing and designing processes that calls for radical overhaul of methods, rather than machines, by first determining the most efficient method of operation and then the technology to implement it.

REAL VALUE-ADDED (RVA) ACTIVITY. Any business activity or subprocess that accomplishes something that the customer values and is willing to pay for.

STATISTICAL PROCESS CONTROL (SPC). The application of certain statistical techniques as a means of monitoring the performance of and maintaining control of a particular process.

STRUCTURAL ANALYSIS. An approach to analyzing the performance of a process, with an eye toward identifying problem areas, which examines the structural elements of the process rather than its end-to-end performance characteristics.

VALUE ANALYSIS. A formal process for isolating the functional attributes of product or service and then identifying better ways to fulfill these functional requirements by reducing cost and/or improving quality. Also referred to as value engineering.
BIBLIOGRAPHY


