BUSINESS EXCELLENCE SOLUTIONS

Encyclopedia of Quality & Reliability

[Submitted Manuscripts]

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ENCYCLOPEDIA OF QUALITY & RELIABILITY
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Overview of Quality Management

Introduction

Quality management (QM) is an essential feature in any organization that desires to be considered reliable by its customers – an organization that consistently keeps the promises that it makes. Reliable organizations design compelling promises for customers and consistently perform according to these promises at a high level of service thereby achieving a competitive edge over their rivals. This approach to quality requires two key elements – innovation to develop new products (whether goods or services) and customer care to effectively and efficiently deliver these products – and obtains predictable financial results for business owners. This means that the value proposition offered to consumers must deliver value that is beyond the offerings of competitors, so that consumers will consistently choose their own organization's products/services instead of the alternative offerings. QM is the approach to develop and maintain a "value edge" in competitive differentiation at a level that assures both market leadership and profitable growth. This outcome is achieved through an integrated system of business practices called *quality management* [1].

Quality Defined

To understand QM requires defining *quality* in a way that eliminates any subjective interpretation. In order to provide an operational definition of quality and illustrate how it is applied, three questions will be addressed: what is quality, how is quality created, and how is quality delivered.

First, We Must Ask What is Quality?

Quality is a comparison of expectations for performance outcomes with the perception of their achievement. Technically quality can have two meanings: it can describe either the characteristics of a product or service that give it an ability to satisfy stated or implied customer needs or it can refer to a product or service that is free of deficiencies. But, the most important aspect of quality is the one that creates business competitiveness for an organization. To describe this perspective a theory of **attractive quality** was developed by Dr Noriaki Kano of Tokyo Science University [2]. The Kano model of attractive quality (Figure 1) illustrates three functions that define the dimensions of competitive quality. (1)

Kano observed that there are three functions that define how quality is perceived by customers as meeting their requirements. When customers describe their quality needs, they define their understood needs; they do not talk about unknown requirements for unanticipated needs or applications nor do they describe their assumptions regarding basic performance that is embedded within their concept of the good or service. The three curves result in different types of customer performance perceptions.

- The lowest curve represents "must be" or standard quality which is characteristic of a commodity product (for instance, there is no competitive value in the standard grade of octane in gasoline – people are likely to change brands for very marginal differences in price). These requirements are not typically described by customers as they are "expected" or "understood" to be part of the package – cars are expected to go and to stop, and most people would feel that these capabilities must not be specified, thus these features deliver no satisfaction to customers but only offer an opportunity to dissatisfy the customer through poor performance.
- The middle curve describes what Kano called *one-dimensional quality* or a product quality feature where companies compete "head to head" to win customer approval (e.g., gasoline consumption of an automobile) and value as perceived by customers is directly proportional to the performance of this feature design. In this category of product feature, quality is directly proportional to the effectiveness of the design to the customer's experience in accomplishing the job they need to accomplish [3].
- The third curve describes the type of quality that always satisfies customers or what Kano refers to as *attractive quality* – quality that anticipates customer needs before the customer knows or understands what capability or feature they are missing. This type of quality comes from innovation – knowing the customer environment and

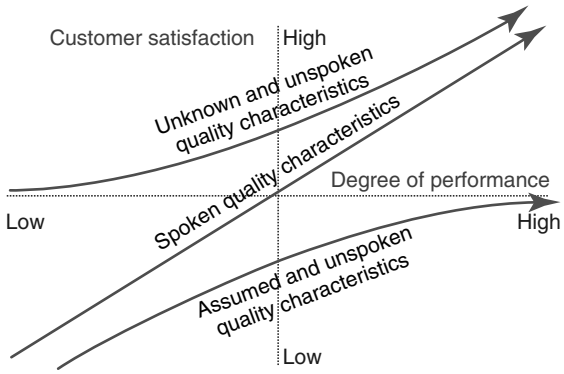

Figure 1 The Kano theory of attractive quality

application so intimately that new technology can be applied to create new competence or capabilities in the job that the customers need to get done. This type of quality provides a disrupting influence on markets and can totally change the balance of its competitive structure.

Thus, according to Kano, quality is directly linked to the ability of a product or service to deliver perceivable value to its targeted customers.

Second, We Must Ask How is Quality Created?

Given this understanding of the importance of the customer's experience, how is this type of quality created? Consider the Watson model for value delivery for a definition of the way quality is created and delivered in the customer experience (Figure 2) [4].

Quality creation is a two-phased process: designing value into products and services and delivering the quality of value that was designed. The design process interprets the customer experience of a Kano analysis to make a commercial promise to the market. This first stage in quality creation establishes the expectations of customers for the value they will receive and defines the offer made to customers. Not understanding or misinterpreting the best value proposition for customers thus results in suboptimization of the organization's potential competitive position. The second stage of quality delivery is in the delivery of the promise that has been defined for customers – a customer care function in which the consistency of promise delivery is evaluated by customers. Managing the daily dynamics of the customer experience must satisfy a quality entitlement – customers are entitled to consistently perceive satisfaction in the delivery of the promised performance. By aggressively executing the delivery of this quality model through an organization's business model, persistent perceptions creating long-term customer loyalty are achieved.

Third, We Must Ask How is Quality Delivered?

Sustained success and profitable growth are achieved when an organization coordinates its activities to deliver quality above its competitors, costs below its competitors, and technology ahead of its competitors. These imperatives must be constructed into a system for quality creation, which is delivered through the business processes of the organization (Figure 3 describes such a basic business model).

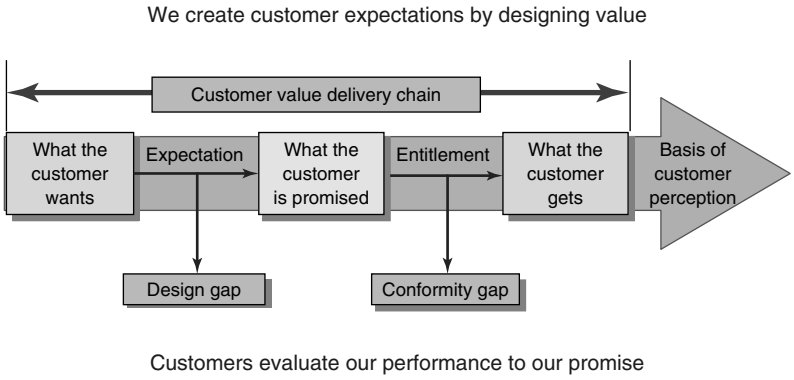

Figure 2 The Watson model for value delivery

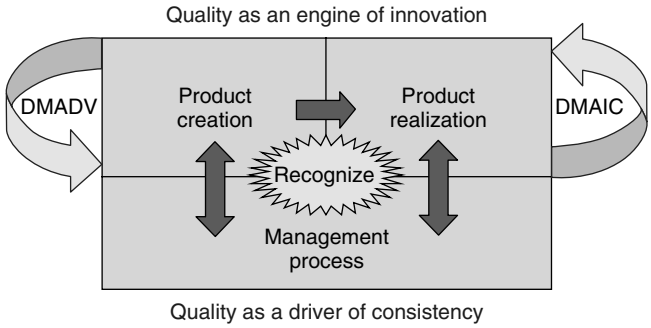

Figure 3 Quality-driven business model

This model characterizes the three core processes of an organization: product creation, product realization, and the process of management.

(2) Figure 3 overlays the linkage of **Six Sigma** methodology and policy deployment on top of the business model to illustrate the linkage between (3) **change management** projects (business improve- (4) ment seeking ***kaizen*** (continuous improvement) or *hoshin kanri* (breakthrough improvement)) to the daily management system (*nichijo kanri*) represented by these core business processes. Note that two types of innovation are required to implement this change management process and that these are expressed by the two different approaches that are taken to resolve issues using Six Sigma business improvement methods:

- DMADV (define–measure–analyze–design–verify) is the design for Six Sigma (DFSS) process that delivers innovation through business development processes by focusing on value delivery through product creation, service creation, or development of new value delivery work processes. This Six Sigma approach resolves issues where a current performance capability is inadequate to meet its future requirements (the designed capability is unable to meet the customer's need).
- DMAIC (define–measure–analyze–improve– (5) control) is the **lean** Six Sigma process that delivers innovation in the product realization process by improving or optimizing the performance of current products, services, and the processes that deliver products or services by applying the methods of statistical problem solving and lean production management. This Six Sigma approach resolves issues where the current level of performance is not achieving its designed capability (achieved **process capability** is less than the designed process capability). (6)

Quality must be managed over the long term but it is delivered in the short-term actions of the daily management system through a disciplined work process. What is the set of specific components that are contained in a quality management system (QMS) and how do they operate?

The Elements of Quality Management

QM differs from the management of quality. QM delivers excellence through a set of good management practices while the management of quality describes the profession of managing the quality function within an organization – the first is applicable to managers in all organizational functions and at all organizational levels, while the second applies more narrowly to a specific profession and its associated disciplines.

QM is an "unnatural act" of establishing and preserving excellence – QM defies the natural law of entropy whereby everything degenerates into a state of mediocrity before it obsolesces.

Management of quality combines several specific disciplines to assure the consistent delivery of the level of service or product quality intended at the point of the customer experience. In managing quality there are five quality disciplines that have evolved over the past century. These five disciplines for managing for quality relate to practices of engineering, assurance, control, and improvement. Taken together

they follow a PDCA cycle (plan–do–check–act) that is often described as the *Deming cycle*[a].

- *Quality engineering (QE)*
  QE accomplishes Deming's "plan" step for designing an enduring level of product or service quality. QE analyzes the steps of an operational process and gives a statistical basis for measuring and managing process performance so it consistently meets outcomes for customer standards or requirements. QE delivers predictable quality outcomes by maximizing process quality to produce the required quality results in the product or service.

(7)
- ***Quality control** (QC)*
  QC describes the methods used to address the Deming "do" step for process management. Control actions include processes for actively testing or monitoring performance, evaluating current performance results against standards for desired performance, and guiding process activities to achieve a state of statistical control by taking corrective action when performance is observed to deviate from this standard. Thus, QC consists of all operational techniques and activities used to fulfill the requirements for quality outcomes by focusing on improving process performance.
- *Quality assurance (QA)*
  QA delivers the "check" step of the quality discipline. QA gives confidence that the customer requirements will be achieved by demonstrating the product or service capability to fulfill performance results as delivered to the final customer. QA is distinguished from QC in that QA focuses on the final test results or compliance with the external quality requirement while QC focuses on the interim test results or compliance with internal quality requirements, which produce final results.

(8)
- ***Quality improvement** (QI)*
  QI executes the "act" step of the PDCA cycle. The QI process is one of continuously improving or adjusting performance to reduce the cost of poor quality, improve the cycle time of process activities, and eliminate waste from all process steps. QI seeks to obtain and sustain the "ideal" process performance that was initially designed into the process capability. QI activities include the work of both Six Sigma and *kaizen* blitz teams who seek to eliminate waste or streamline process activities.
- *Quality audit and review (QAR)*
  QAR is a systematic, independent assessment of the entire quality system to determine the effectiveness of both the quality plan and its execution through application of the four disciplines of quality in the work processes of the organization. Thus, QAR "checks" on the value of governance in the PDCA activities of an organization's formal QMS.

When these five quality disciplines are combined into a systematic approach for the delivery of quality results, they become the cornerstones of a sound QMS. Thus, the "professional" dimension of QM may be defined as follows:

- *Quality management (QM)*
  The process of designing and deploying a system for managing processes to achieve maximum customer satisfaction with product or service quality at the lowest overall cost to the organization while continuing to improve the performance outcomes of the process.

This professional dimension of QM seeks to instill a systematic way of working in the entire organization for delivering quality outcomes – achieving organization-wide practices that deliver managing for quality. What are the ingredients of this system?

Management System for Delivering Quality

The formal QMS of an organization is a documented process for managing these five dimensions of QM (described above) and QMS describes the context for the design, development, deployment, and delivery of quality activities throughout the organization. The QMS documents and executes the organization's quality policy (strategic direction about how the organization will work to deliver quality) and it can be summarized as the PDCA of the management system: quality planning, quality standards (defines the system of work activities, controls and tests, as well as the control plan to assure that the system operates effectively despite any potential contingencies), QA, QC, and QAR, which must occur supported by the activities of an iterative process for QI. The QMS is a formal system to document the organization structure, management responsibilities,

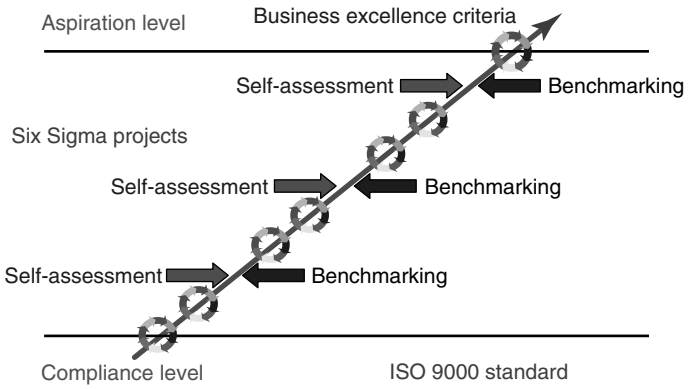

Figure 4 An integrated quality system for total performance management

and organization-wide procedures that are required to achieve effective QM as a routine way of working. The ingredients of the QMS documentation include the following:

- *Quality policy*
  An organization's general statement of its beliefs about quality, its vision of how quality will come about and what should be the expected results.
- *Quality plan*
  A document or set of documents that describe the standards, quality practices, resources, and processes pertinent to the assurance of quality for a specific product, service, or project through the application of the four quality disciplines.
- *Quality standards*
  The documented description of accepted way to perform work and quality operating practices so that "best practice" is applied as a discipline in the daily working environment. This documentation includes standard operating procedures as well as control plans to assure proper measurement and interpretation of the critical quality process measures and the judgments made to interpret them regarding quality performance. Standards should also exist to describe how each of the core disciplines of QM will be managed.
- *Quality systems*
  The information systems that manage data for product and service performance, customer and market information about complaints, failures, warranties, and the record of responses to such claims.

The typical system for delivering quality in a modern company contains a number of proven ingredients for success: ISO 9000, business excellence criteria, and Six Sigma which can be forged into the process management architecture that is shown in Figure 4.

This integrated QMS seeks to maintain a business control system based on the ISO 9000 Quality Management Standard while encouraging the organization to aspire to apply the "best practice" principles of QM, which have been distilled into the award criteria for business excellence prizes such as the Malcolm Baldrige National Quality Award or the European Quality Award. These award criteria address a system of areas for concern in the development of a business management system that were developed as a consensus from many of the world's best companies. No company has ever scored above 800 points using these criteria as a standard, so they provide a way to challenge organizations to initiate self-improvement projects that close the gap in opportunities for improvement that are discovered when the organization conducts a self-assessment or conducts formal benchmarking with an organization that is recognized as superior by their management team. These improvement projects can be conducted using the Six Sigma DMADV or DMAIC methods.

Achievement of exceptional performance using such a management system requires that the organization develop "leadership at all levels" of its structure. What does this mean in terms of the quality actions of the organization's business leaders? We have finished discussing the key dimensions of management of quality; now let us turn back to understanding how QM can be infused into an entire organization

as it integrates its QMS into its core business to manage performance in all dimensions of business excellence while ensuring successful results from the perspectives of all the organization's stakeholders (e.g., customers, employees, suppliers, investors, legal and regulatory authorities, etc.).

Pervasive Quality Leadership

It is a tall order to deliver this kind of management system. It requires, as Warren Bennis observed, the kind of situation where: "a leader is a follower is a leader" [5]. Bennis noted that we are facing a "chronic crisis of governance – that is, a pervasive organizational incapacity to cope with the expectations of their constituents – [that] is now an overwhelming factor worldwide. If there was ever a moment in history when a comprehensive strategic view of leadership was needed, not just by a few (9) leaders in high office by **large numbers** of leaders in every job, from the factory flow to the executive suite, this is certainly it" [6]. In order to have a system of sound business management there must be good role models of management quality – not just at the top of the organization, but throughout its entire structure so that the people can see this behavior is not just applicable for the "superleaders" but that is also part of the expectation for every ordinary worker – including supervisors – and they are also capable of exhibiting the shared values and behaviors that operationally define quality actions throughout the entire organization. This consistency assures that each person understands that the vision of leadership is not about wishing, hoping, or praying: it is an act of courageous leadership that must be duplicated at all levels of the organization. What does leadership at all levels look like?

Executive Leadership

Senior managers must establish the vision and values that will guide their organization into its future state. One way executives demonstrate leadership is by establishing a framework for action through a management process for cascading values and objectives that define the way the organization will work together and the goals that it will seek to accomplish in pursuit of its long-term mission. A critical aspect of the process of management that remains the active responsibility of the top management team is conducting regular leadership reviews of the business. This activity is both a due diligence responsibility of the business owners and a fundamental approach for exercising leadership. Leadership reviews have at least two emphases: review of the governance structure and "strategic direction of the organization" as well as review of strategic problem areas that lead to business vulnerability through challenging technologies, violation of critical assumptions, or changing "rules of competition" in the market. Leadership reviews offer the top management an opportunity for

- demonstrating personal commitment to their "philosophy of management";
- providing visibility for their "defining **moments** (10) of quality encouragement";
- mentoring the organization to achieve desired behavioral changes;
- guiding cross-organizational efforts to achieve desired systemic change; and
- encouraging people to "build a desire to win and a will to act".

What else can executives do personally to demonstrate "positive leadership behavior"? A few examples include the following:

- *Executive touch program*
  Program for top executives to get close to the leading targeted external customers. Requires quarterly visits that are intended solely for relationship building to establish a foundation for future business discussions.
- *Executive customer advocate program*
  Program for the senior management team to facilitate significant problems encountered by major customers in each of the primary lines of business.
- *Complaint listening program*
  Program for all levels of management to spend a few hours monthly listening to "real" customer complaints directly on call center lines.
- *Executive escalation program*
  Program for the top level of senior managers to rotate through a monthly "duty day" where they are represent formal escalation "points of last resort" for resolving all customer complaints.
- *Executive compensation program*
  Change the compensation so a significant element of the "reward component" is granted for

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a "statistically valid" increase in customer satisfaction as measured by a valid external method.

Business leaders must exhibit consistency in all that they do. Lack of consistency is considered by employees to countermand the organizational culture and may cause deterioration in a shared system of values. It is particularly important to demonstrate consistent performance when one of the tenants of the organization is "empowerment" – the ability to make individual choices within a set of boundary conditions. An organization's vision provides direction for empowerment, but its values provide the boundaries for making choices.

Management Leadership

Managers may also become leaders. The definitions of manager and leader are not mutually exclusive. Each person appointed to a management function should at least aspire to becoming a local leader. What can be done to demonstrate leadership at the local level? Several actions can be suggested:

- taking an active role in leading the local implementation of a major business or QI initiative that has strategic value to the organization as a whole;
- showing a personal interest in developing the next generation of leaders through the personal mentoring of high-potential employees;
- "managing by wandering around" and taking time to talk with employees about any issues or concerns they may have, providing brief words of encouragement, and taking action to apply their insights for better management of work or business processes;
- sponsoring and reviewing improvement projects that deliver on the annual continuous improvement objectives of their own management area of responsibility;
- recognizing the improvement efforts of frontline teams and individuals;
- developing the core competence of their organization through team-based on-the-job education and training programs; and
- exercising information transparency by communicating to all employees about business results and briefing them on both the strategic direction and any news that directly concerns them or their livelihood.

Frontline Leadership

Leadership is often required at the frontline in order to coordinate action and encourage common behaviors that reinforce organizational values. Each person can exhibit leadership as a means to encourage fellow employees and provide an example that reinforces the behaviors of the value system. Some of the actions that can be taken at the personal level include

- participate actively in their work group or team process management activities and continuous improvement projects;
- develop their personal problem-solving and statistical analysis skills;
- mentor new employees in the cultural values and historical accomplishments of the organization;
- pursue certification in the core skills involved in the profession and demonstrate mastery of the tools and methods of their own trade;
- provide improvement ideas and suggestions to managers whenever any opportunities for improvement are observed in the work process;
- participate on teams for conducting self-assessments, audits, and cross-functional process improvement;
- take responsibility for their personal development and pursue a combination of both internal and external courses that deliver their career objectives; and
- recognize the contributions of colleagues and team members and encourage their achievements by expressing appreciation for their positive involvement in team improvement projects or personal suggestions made for process improvement.

Personal Leadership

True leadership is not in words, but in deeds: "The authentic test for mastery of learning is not in what a manager [person] says, but in what a manager [person] does" [7]. This requires a consistent practice that is developed from the inside out and exists on both personal and interpersonal levels both within the local work experience and across the whole organization. This effort requires two key focus areas: managers must empower the workforce to exhibit the principles of total quality leadership and frontline workers must become aligned with the strategic direction, improvement objectives, and

cultural values of the leadership team. Each employee should aspire to represent a role model of the behavior desired of colleagues in the organization. This principal is also a cornerstone of the lean methods of the Toyota production system where employees are held accountable for the quality of their work and are expected to manage the quality of their work using a self-regulated QC approach. This raises an important question about the responsibility for quality and the role of quality professionals in managing to achieve quality outcomes in contrast to the responsibility of both process owners and workers for the quality of their own work output. What is the role of a quality professional in managing for quality?

Professional Leadership: The Role of a Quality Manager

Responsibility for Quality Performance

Who is responsible for the quality outcome of work? Is it the individual doing the work, the supervisor of the work effort, the owner of the work or business process owner, or the leader of the business area? There is a quandary: if everyone is responsible for the quality of work, then nobody is accountable! The resolution of this quandary lies in the multiple levels of responsibility – which fosters different types of accountability! Responsibility accumulates from bottom up; however, accountability is delegated from higher levels of authority to lower levels in the organizational structure. Thus management delegates responsibility for quality performance of work to the workers, but maintains overall responsibility and accountability. Workers can only be held responsible and accountable in the area of work that has been properly delegated to them. You cannot have accountability without responsibility! What does it take to hold someone properly accountable for executing their responsibility and then delivering the desired level of quality in their work? According to the sage advice of Peter Drucker, there are three conditions that must be satisfied to hold a worker personally accountable for the quality of their work:

1. Employees must have specific knowledge of the job they are asked to perform in terms of specifications, measurements, systems for work performance, and contingency actions that should be performed when work quality is not acceptable according to standards and they must be trained to perform to these work requirements.
2. Employees must know the standard of quality they are expected to deliver (the targets or goal of their performance expectation).
3. Employees must have the ability to monitor their work progress and be delegated the authority to make decisions that allow them to self-regulate their own performance to consistently meet the standards of performance [8, 9].

When these three conditions are not met, then the business managers retain the responsibility and accountability for all aspects of work quality. The job of a professional quality manager is to develop the QMS that assures that responsibility for execution of work practices leading to consistently sustainable quality results is achieved. What behavioral characteristics does it take to be such a "local leader" of the organization's quality practices?

Behavioral Qualities of an Exceptional Quality Manager

On the basis of a behavioral analysis of successful and unsuccessful quality managers, there are some common traits that have been identified as distinguishing between the most successful quality managers and those who were not perceived by their bosses as being successful. Sixteen traits were identified as leading to success [10]. Interestingly, only one trait was observed to detract from managerial performance. The positive behavioral traits that were discovered in this study included customer oriented, customer advocate, organizationally astute, influencing, goal oriented, interpersonally diagnostic, persistent, organizational planning, initiating, mentoring subordinates, collaborative, professional, conceptual, innovative, communicative, and self-confident. The one negative trait that leads to loss of personal influence and ineffective personal interactions was "making fast decisions." On the basis of these characteristics, it is clear that a "local quality leader" must behave like an internal consultant acting without the direct management authority and responsibility for line management (e.g., management of the profit and loss centers of the organization) but must convince others, through persuasive use of data, as to what is the right course to take. In an interview with Peter Drucker he was asked: how can a quality professional

convince their business leader to "do" quality? His answer was most educational. Drucker said, "It is not your job to train your CEOs. They are bright people and can understand quickly what needs to be accomplished. However, it is the job of staff to clearly report necessary information that CEOs can easily assimilate and understand, so they may draw their own conclusions" [11]. The "secret weapon" of quality professionals is the use of data as a means to convince management to act. Communicating concerns with clarity and confidence is perhaps the greatest competence that a quality professional can have.

Summary

What is quality? Quality is the never-ending pursuit of excellence in product or service performance as judged according to the standards of customers relative to alternative choices they have for selecting similar goods or services from competitors. These customer standards for quality change over time and are influenced by a wide variety of external forces such as technology and regulatory legislation. As quality improves in one area in life, it often has a positive influence by increasing the requirement for quality in other areas. Thus, managing to improve quality is an essential ingredient to continued success and QM is a business requirement that will continue to be part of the "essential work" of organizations.

End Notes

[a.] Although PDCA is often called the *Deming cycle* it was first described by Walter Shewhart and the PDCA version was actually developed by the Union of Japanese Scientists and Engineers (JUSE) translators of Dr Deming's lectures under the supervision of Kaoru Ishikawa.

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10 Overview of Quality Management

Abstract: Quality management involves assessing, planning, improving, and controlling work that people accomplish to achieve their shared objective of service to their customers. Quality management requires attention to detail at each level of the organization: leaders must focus on concerns of shareholders and the community; managers must focus on commercial objectives for their targeted markets; and operational teams must focus on the daily work routine of the organization. Each level is responsible for contributing a unique element of the overall quality program. Quality management delivers a consistent system of working that establishes criteria for challenging aspirations for the desirable behavior of the organization, plans improvement objectives based on gaps in performance between the desired state of performance and the current observations of performance, improves work by executing projects that change the way that the routine work processes perform, and defines standards of performance for continuing control of these routine work processes. The components of a quality management system are usually derived from the Malcolm Baldrige National Quality Award criteria for business excellence, external benchmarking studies, total quality management, Six Sigma, and lean production methods, and then these components are packaged into a structure that adheres to the ISO 9000 standard for a quality management system (or other appropriate quality system structure).

Keywords: total quality management; kaizen; continuous improvement; business excellence; Six Sigma; benchmarking; policy deployment; self-assessment

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For the attention of the Editor-in-Chief

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(2)	eqr208	Six Sigma Method	
	eqr491	Design for Six Sigma Creates Organic Growth	
	eqr421	Six Sigma	
(3)	eqr489	Change Management: The Stakeholder Assessment	
(4)	eqr391	Kaizen	
(5)	eqr408	Creating Flow with Lean	
(6)	eqr300	Control Charts and Process Capability	
	eqr277	Process Capability, Overview	
(7)	eqr393	Statistical Quality Control	
(8)	eqr390	Quality Improvement	
(9)	eqr224	Laws of Large Numbers	
(10)	eqr226	Moments	

Benchmark Processes to Define Improvement Projects

Introduction

In 1990, Roger Milliken called benchmarking *the art of stealing shamelessly* and since then many have used benchmarking to generate "quick fixes" for their performance problems. However, benchmarking is not just for quick fixes, it can also provide a rigorous process that requires both "sweat equity" – learning about one's own processes and performing the logistics of coordinating study missions to other organizations – and "analytical thoroughness" – measurement and analysis of sustained work process performance as well as the detailed mapping of processes and side-by-side evaluation of process differences. Benchmarking uses the analytical information contained in a benchmark, or a comparative measure of process or results performance to establish which organization is the candidate for a "best practice" in a specific business process. Then the business process must be specified in order to understand how the benchmark was achieved and to identify enablers of successful overall performance. Finally, a cultural adaptation of the learning must be made in order to apply this new knowledge to another organization. For benchmarking to be successful, it must heed the warning of Dr. W. Edwards Deming who said, "It is hazard to copy. One must understand the theory of what one wishes to do." Cultural adaptation and business model adaptation are necessary to assure that the lesson observed in one organization can be successfully transferred to another organization. As Deming also cautioned, "Adapt, don't adopt. It is error to copy."

Benchmarking Definitions

What is benchmarking? In order to understand this methodology, it is essential that definitions be agreed upon for the meaning of some key terms. The first definitions that must be agreed upon are terms that identify the types of benchmarking studies and their operational approaches:

Process Benchmarking

The method for comparative analysis of work process performance between two unique or distinct implementations of the same fundamental process is called *process benchmarking*. It includes both the internal inspection of an organization's own performance as well as the external study of an organization's recognition for achieving superior performance as evidenced by objective standards of comparison (benchmarks). The objective of process benchmarking is not to calculate the quantitative gaps in performance, but to identify best practices that may be adapted for improvement of organizational performance. There are four types of process benchmarking studies: strategic, operational, performance, and perceptual benchmarking.

Strategic Benchmarking

The process benchmarking of organizational strategy or key business process performance in order to determine breakthrough opportunities for profitability and productivity improvement is called *strategic benchmarking*. This type of benchmarking focuses on those critical business areas that must change to attain or maintain the competitive advantage of a business. Strategic benchmarking studies focus on critical business assumptions, primary competence areas, core business processes, technology inflection points, or business fundamentals that define organizational purpose. The purpose of strategic benchmarking studies is to challenge the management to move from a current state to a desired state of the whole business. Examples of strategic benchmarking studies include evaluation of options for the design of an organization's governance structure, assessment of approaches used to implement advanced technology (e.g., enterprise management software or paperless document handling), or strategic business issues that are faced by the organization (e.g., creating a web-based business capability; managing the technology transition across generations of advancement; or managing the routine work of the organization through management methods such as balanced scorecard, performance management, and business excellence assessments).

Operational Benchmarking

The process benchmarking of work processes or practices in order to discover opportunities that will

provide productivity improvement in the areas of effectiveness, efficiency, or economy of the routine business operations is called *operational benchmarking*. This type of benchmarking focuses on specific work activities that need to be improved and seeks to identify the work procedures, production equipment, skills or competence training, or analytical methods that result in sustained performance improvement as indicated by objective measures of process productivity (process throughput, cost per unit, defect opportunities, cycle time, etc.). Examples of operational benchmarking studies include analysis of invoicing procedures to determine the most productive process, evaluation of production methods to determine the highest throughput methods that deliver lowest cost and least defects, and study of logistics distribution methods that result in both high-delivery service performance and low levels of finished goods inventory.

Performance Benchmarking

The process benchmarking of product or service results using a standard comparison or test under known operating conditions is called *performance benchmarking*. This type of benchmarking seeks to answer the question which product or service is better based upon rigorous assessment using objective performance criteria. Examples of performance benchmarking studies include consumer product analysis that evaluates products on a "head-to-head" basis using a fixed set of criteria for performance, evaluation of product performance using a standard test, such as operating time to run a specific application, or endurance tests that identify the ability of a product to perform over a fixed period of time under comparable operating conditions.

Perceptual Benchmarking

The process benchmarking feelings or attitudes about process, product, or service performance by the recipient of the process output is called *perceptual benchmarking*. This type of benchmarking seeks to answer the question how do you perceive the delivery of service, performance of product, or execution of process by the people who are recipients of these outputs. Perceptual benchmarking uses attribute or categorical data to quantify subjective feelings and establish relative ranking of performance based on such criteria as timeliness of performance, goodness of knowledge transfer, soundness of information, courtesy of delivery agents, and so on. Examples of perceptual benchmarking include surveys of training satisfaction at the completion of a training event, employee satisfaction surveys to determine either the work climate or structural issues regarding compensation and benefits, or customer satisfaction with the product or service delivery to the marketplace.

The next definitions that must be agreed on are the terminologies that identify the sources of data used in conducting a specific benchmarking study. This is an older and somewhat less helpful way to identify benchmarking studies. This categorization of benchmarking practice according to the source of data leads to conclusions about the relative utility of information from these sources.

Competitive Benchmarking

An approach to benchmarking that targets specific product designs, process capabilities, or administrative methods used by one's direct competitors (e.g., the study of performance in the laptop computer industry that features only those companies that produce these products).

Industry Benchmarking

An approach to benchmarking that seeks information from the same functional area in a particular application or industry (e.g., benchmarking the purchasing function to determine the most successful approach for managing a supplier base).

Internal Benchmarking

An approach to benchmarking where organizations learn from "sister" companies, divisions, or operating units that are part of the same operating group or company (e.g., the study of internal research and development groups to determine best practices that reduce the time to market for the new product introduction process).

Generic Benchmarking

An approach to benchmarking that seeks process performance information that is from outside one's own industry. Enablers are translated from one organization to another through the interpretation of their

analogous relationship (e.g., learning about reducing cycle time in production operations by the study of inventory management methods used in stocking fresh vegetable in grocery stores).

Comparative advantages and disadvantages of these benchmarking data sources are presented in Table 1.

The final definitions that must be agreed on are the terminologies that are used to describe the different aspects of a benchmarking study:

Benchmark

A benchmark compares performance between products, services, or processes of analogous organizations in order to establish which one is superior in its sustained performance. Note that many of the benchmarks that are publicly promoted indicate only "spot" performance at a specific point in time and do not meet the criteria of "enduring success" by failing to establish the difference in performance between a "special cause event" and a "common cause" management process. A lack of statistical discipline in the use of benchmarks threatens to diminish the perceived value of the process of benchmarking (see the section titled "Presenting Benchmarking Results").

Best Practice

Best practice defines the set of activities, tasks, resources, training, and methods that created the observed benchmark level of performance in an observed work process. In a process benchmarking study, in order to qualify as a "best practice" the performance must be observed and mapped to assure that the work performed is properly identified and that process experts have validated and verified the distinctions between observed best practices and merely good practice. Without the objective assessment by work process experts, "best practice" becomes a subjective claim that is not verifiable.

Critical Success Factors

These are quantifiable, measurable, and auditable indicators of process performance and **process capability** in key business processes. They indicate in basic business terms the performance level obtained in a comparative manner using such basic building blocks of processes to describe the performance of business effectiveness (quality), efficiency (cycle time), and economy (cost). Key critical success factors are universal and may be used for cross-organizational comparisons for the same process. (1)

Table 1 Benefits analysis of benchmarking data sources

Source of data	Advantages	Disadvantages
Competitive benchmarking	Provides a strategic insight into marketplace competitiveness and a "wake-up" call to action	Legal issues regarding data sharing among competitors
		Study detail may not be good enough for process diagnosis
Industry benchmarking	Takes advantage of functional and professional networks to gain study participants	Functional concentration tends to support operational rather than strategic studies
		Does not challenge paradigm of functional thinking
Internal benchmarking	Provides highest degree of process detail and simplified access to process information	The internal focus tends to be operational, rather than strategic, and reinforce the organization's cultural norms
Generic benchmarking	Has the greatest opportunity for process breakthroughs	Difficulty in developing an analogy between dissimilar businesses
	Because organizations do not compete, reliable detailed information is usually available	Difficulty in identifying the companies to benchmark
	Provides incentive for strategic change initiatives	Difficulty in establishing the appropriate contact for a study

Enabler

The specific activity, action, method, or technique that stimulated progress in one process over the comparative processes and led to identification of a best practice (e.g., the way **quality function deployment** or **failure mode** and effects analysis was used in a product design process; a process for data presentation that more clearly indicated the action to be taken by frontline operators; or an employee training and development system that delivers the appropriate skills and competence to process workers as they require these methods to perform their work in a changing technological environment).

(2) (3)

Entitlement

The set of work process lessons learned that are derived by examination of one's own processes and discovery of wasted activities, duplicated steps or nonvalue-added work that can be eliminated or modified solely on the basis of the self-analysis phase of benchmarking. An organization is "entitled" to make such process changes without relying on the lessons learned from external discovery. Such improvements permit the process to operate as intended and represent gap closure between original process design and current process performance. *Entitlement* also refers to the gap that may exist between the design process capability (C_p ratio) and the achieved process capability (C_{pk} ratio) as management is entitled to the performance that they purchased with their capital investment.

Gap Analysis

Gap analysis evaluates the performance difference between current internal performance and benchmark performance at the best practice organization. To be effective, a gap analysis should include both the use of statistical **confidence intervals** and the tests of difference (for both means and variance) to demonstrate that a real performance gap has been observed and not a gap due to chance observations.

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Radar Diagram

A radar diagram provides a multivariate display of comparative performance for several dimensions of interest (e.g., cost, cycle time, quality, and productivity). These dimensions are displayed on a single chart as spokes from the center where each measure has its own unique scale; however, all indicators are shown on the same graphic to illustrate a performance profile for a specific process. The radar diagram provides a more complete benchmarking assessment than a single-point measure of performance comparison.

Baseline Analysis

At the beginning of a study a baseline analysis is conducted to compare performance data across all benchmarked processes. A common scale is used for each comparison based on the variation observed in process performance. A best process is one that has the highest average sustained performance and the lowest variation in the daily results. The performance baseline comprehends both of these factors using a standardized metric for process comparisons (e.g., process standard deviation as calculated using the defects per million opportunities as evaluated against a common customer requirement for targeted performance). The baseline analysis may be presented as an analysis of variance showing sampled performance as a function of the different process locations.

World Class

Although it is intuitively clear that there is no one world best performance that exists at a particular point in time (the enormity of analysis to support such a claim would be unmanageable), it is possible to define a category of performance as "world class" by the fact that using a standardized measurement process (e.g., the performance baseline analysis), the process was observed in the top 5% of all performance noted in the study. This indicates that there is a high confidence level that the process is in a leadership position and worthy of investigation for potential best practice areas.

Benchmarking as a Discipline of Total Quality Management

In the development of total **quality management** (TQM), benchmarking has a unique place as both a tool to stimulate improvement and a management

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technique that aids in strategic positioning of an organization. Benchmarking provides opportunities for full organizational participation in business process improvement by engaging the management team in the architecture of change and choice of focus areas for study; involving the middle managers in self-assessment of the work processes that they own and in adapting the lessons learned from other organizations; and relying on the study of related processes by the organization's frontline process experts who are charged with discovery of the significant differences that lead to performance gaps.

What is benchmarking and how is it used? Benchmarking is a structured approach for learning about process operations from other organizations and applying the knowledge gained in your own organization. It consists of dedicated work in measuring, comparing, and analyzing work processes among different organizations in order to identify causes for superior performance. Benchmarking is not complete with just the analysis, however, it must be adapted and implemented in order to have a complete cycle of learning.

The objective of benchmarking is to accelerate the process of strategic change that leads to breakthrough or continuous improvements in products, services, or processes, resulting in enhanced customer satisfaction, lower operating costs, and improved competitive advantage by adapting best practices and business process improvements of those organizations that are recognized for superior performance. Benchmarking is a method that forces organizations to look outside themselves in order to avoid myopic illusions of grandeur that come from reflecting on internal experience without external validation.

Benchmarking is not just a checklist or set of numbers that are used to make management feel better about their current performance. Benchmarking should make management uncomfortable due to the identification of gaps in business performance. Benchmarking should challenge management due to the discovery of performance enablers that could help them to improve. Perhaps the juxtapositions shown in Table 2 can help describe this situation.

Benchmarking Logic

It is important to observe that the logic of the benchmarking process does not fail the test that was issued by Dr Deming in the early 1980s, when he cautioned executives against deadly diseases in the management of business that were derived from setting arbitrary goals based solely on visible performance measures, without understanding the depth of profound (process-related) knowledge that lay underneath most high-level performance measures.

Dr Deming would call "arbitrary" the use of benchmarking with the following logic:

- "Our competitor's price is 15% lower than ours; therefore, we must lower our cost by 15%."

The logic of benchmarking is much more process oriented and requires the development of the type of profound knowledge that Deming advocated:

- "Leading companies have operations that are 20% more effective than our operations."
- "The reasons that their operations are more effective is because . . . "
- "The practices that they used to improve these operations include . . . "
- "The following enhancements to our processes are appropriate for our business model and our culture and will improve our performance: . . . "
- "The estimate of performance gain due to implementation of these enhancements is . . . "

Table 2 Defining the scope of benchmarking

Benchmarking is	Benchmarking is not
A discovery process	A cookbook process
An improvement methodology	A panacea for problem solutions
A source of breakthrough ideas	About "business as usual"
A learning opportunity	A management fad
An objective analysis of work	A subjective "gut feeling" or opinion
A process-based learning approach	Just measurement of process performance
A means to generate ideas	Just quantitative comparisons

The ability to apply this logic comes from developing an understanding of the root cause of process improvement at the benchmark organization and translation of their lessons learned into appropriate change for your own organization. By a process of conscientious learning and cautious adaptation, a company can learn the lessons needed to move it to the level of world-class performance.

Operational Definition of World-Class Performance

Benchmarking seeks to deliver performance that is "best of the best" (the Japanese word for this is *dantotsu*) or world-class performance. World class is an elusive performance level. To be the "best of the best" it is necessary that you have both a high level of performance (top 5%), and that this level of performance be sustainable across changes in product life cycle, underlying technology in both the product and the process, as well as successive generations of executive leadership. That is a tall order for any organization.

What does it mean to be world class? One definition [1] considers a world-class company as one that is able to achieve and sustain a leadership performance level, while at the same time exhibiting the following competitive considerations that are significant learning areas for a TQM-oriented organization. According to this definition, a *world-class organization*

- knows its processes better than its competitors know their processes,
- knows its industrial competitors business better than their competitors know them,
- knows its customers better than their competitors know their own customers,
- responds more rapidly to change in customer behavior or needs than its competitors,
- engages employees more effectively than its competitors, and
- competes for market share on a customer-by-customer basis.

Clearly this definition of world class requires both an objective performance standard as well as the profound knowledge of its business and commercial environment in order to enjoy sustained performance at this level.

The Process of Benchmarking

Not surprisingly, there is a process for process benchmarking. Many different organizations have illustrated benchmarking processes from 4 to 42 steps [1]; however, the process that I favor has seven steps which highlight the work that must be done in a benchmarking study and which also follow a four-phase process that is generic to all benchmarking models:

1. Identify subject – choose what to benchmark
2. Plan study – identify your partners and plan your **data collection** (6)
3. Collect information – actively collect the data and visit partners
4. Analyze data – analyze the data for performance trends and consistency over time
5. Compare performance – compare results and test differences for statistical significance
6. Adapt applications – prepare the lessons learned for transition to your own culture
7. Improve performance – implement projects to improve your processes

The generic four-phases that these steps cover roughly follow Deming's plan–do–check–act (PDCA) process management and improvement cycle. These four process benchmarking phases are summarized as follows:

- Plan: design the study and evaluate the baseline performance.
- Collect: collect internal and external data about the process.
- Analyze: conduct a gap analysis and determine enablers of success.
- Improve: adapt the recommendations and implement the process improvements.

Each phase of this benchmarking process is described in the following sections.

Benchmarking: Plan

The steps involved in planning a benchmarking study include

- Select a process.
- Gain the owner's participation.
- Select a leader and a team.

- Identify customer expectations.
- Analyze process flow and measures.
- Define process inputs and outputs.
- Document the process.
- Identify process critical success factors.
- Determine data collection elements.
- Develop a preliminary questionnaire.

Some of the questions that must be answered during this phase of a benchmarking study include

- What process should we benchmark?
- What is our process and how does it work?
- How do we measure it?
- How well is it performing today?
- Who are the customers of our process?
- What products and services do we deliver to our customers?
- What do our customers expect from our process?
- What are the critical success factors for this process?
- What is our process performance goal?
- How did we establish that goal?
- What data should we collect for comparisons?

Notice that many of these questions are similar to the basic questions that one confronts in any TQM improvement project.

Benchmarking: Collect

The steps involved in collecting data for a benchmarking study include:

- Collect internal data.
- Perform secondary research.
- Develop partnership criteria.
- Identify benchmark partners.
- Plan data collection.
- Develop survey or interview guide.
- Solicit participation of partners.
- Collect preliminary data.
- Conduct site visits.

Some of the questions that must be answered during this phase of a benchmarking study include

- What companies perform this process better?
- Which company is best at performing this process?
- What can we learn from that company?
- Who should we contact to participate as our partners?
- What is their process?
- How representative is the process across different areas of their organization?
- How do they measure process performance?
- What is their performance goal and how was it set?
- How well does their process perform over time?
- Is there any difference in performance at different locations or based on seasonal change?
- What business practices, methods, or tasks contribute to the process performance?
- What factors could inhibit the adaptation of their process into our company?

Notice that many of these questions are the same as questions that would be addressed in any TQM-based data collection activity.

Benchmarking: Analyze

The steps involved in analyzing benchmarking study data include

- Aggregate the data across units but preserve subgroup relationships.
- Normalize performance to a common performance base (e.g., σ scale).
- Compare current performance to historical data.
- Test performance for difference in both trend of performance average and variation.
- Test differences for statistical significance.
- Identify gaps in performance and the root cause of all significant differences.
- Identify entitlement opportunities.
- Forecast performance observations to the business planning horizon.
- Develop case studies of best practice.
- Isolate process enablers.
- Assess adaptability of process enablers.

Some of the questions that must be answered during this phase of a benchmarking study include

- What is the basis for comparing our process measurements?
- How does their process performance compare with our process performance?
- What is the magnitude of the performance gap?

- What is the nature or root cause of the performance gap?
- How much will their process continue to improve?
- What characteristics distinguish their process as superior?
- What activities within our process are candidates for improvement?

Note that many of the questions addressed above are the same as would be addressed in any TQM or (7) **Six Sigma** improvement project.

Benchmarking: Improve

The steps involved in implementing the lessons learned from a benchmarking study include

- Set goals to close, meet, exceed the gap.
- Modify enablers for implementation.
- Gain support for change among all involved parties.
- Develop the action plan.
- Communicate the plan.
- Commit resources to achieve the plan.
- Implement the improvement plan and document the changes.
- Ponitor and report progress on targeted schedule.
- Identify opportunities for further process improvement.
- Recalibrate the benchmark measure after implementation.

Some of the questions that must be answered during this phase of a benchmarking study include

- How does our knowledge of their process help us to improve our process?
- How should we forecast the future effectiveness of their process performance?
- Should we redesign our process or reset our performance goal based on this benchmark?
- What activities in their process need to be modified to adapt it into our business model?
- What have we learned during this study that will allow us to improve on "best" practice?
- What goals should we set for our own process improvement?
- How can we implement the changes in our process?
- How will other companies continue to improve this process?

Note that many of the questions addressed above are the same as would be addressed in managing implementation in any project improvement process.

Methods of Data Collection

In conducting a benchmarking study, there are several different approaches to data collection that can be pursued by a benchmarking team. Table Tables 3 and 4 illustrate several schemes for data collection and identify when to use each approach as well as the advantages and disadvantages associated with each of the methods.

Presenting Benchmarking Results

Some final points should be made about the process of benchmarking relative to the analysis and presentation of benchmarking data. Care must be taken in the data analysis efforts to assure that benchmarks are representative of real-world performance. Specific cautions include the following statistical problems in benchmarking:

- single data point measurements that are passed off as "benchmarks",
- **measurement system**s not validated for sensitivity of observation or **calibration**, (8) (9)
- averages used to represent performance benchmarks,
- missing variation data in process characterization,
- components of variance not identified according to their source,
- comparative charts not indicating *both* mean and variance,
- process changes not correlated with performance shifts, and
- interactions not identified among the different process variables.

Clearly, there can be many issues that create problems in the measurement and analysis of results from benchmarking studies. Careful planning and solid data collection and analysis efforts can achieve theelimination of these opportunities for error

Table 3 Data collection methods–1

Method	Existing data review	Questionnaire/survey	Telephone survey
Definition	Analysis and interpretation of data that already exists in-house or in the public domain	Written questions sent directly to benchmarking partner – can contain any type of question: multiple choice, open-ended, forced choice, or scaled answer	A written script of questions that are used to solicit data or guide a conversation during a telephone call to gather data and information
When to use	Before conducting original research to establish what is the historical baseline	When you need to gather the same information from a large number of sources	When information is needed quickly or to conduct a fast screen of potential sources
Advantages	A large number of sources of information are available and most are accessible from your own organization	Permits extensive data gathering over time, can be analyzed by computer (if OCR form is used), and data is easy to compile	Can cover a wide range of respondents quickly, people are more candid over the phone and can also amplify answers in follow-up questions
Disadvantages	Gathering this information can be very time consuming	Response rates are low; and interpretation of questions can be subjective, creative ideas rarely surface, probing for "how to" answers is difficult	Locating the right person to answer, no exchange of process information occurs, and often requires multiple phone calls

Table 4 Data collection methods–2

Method	Interview	Focus group	Site visit
Definition	A face-to-face meeting with a benchmarking partner using questions that are prepared and distributed in advance	A panel discussion between benchmarking partners with a third-party facilitator at a neutral location	An on-premises meeting at a benchmarking partner facility that combines an interview with work process observation
When to use	When you need one-on-one interaction to probe and drive data collection to a specific objective or level of detail	When you want to gather information from more than one source or perspective at the same time – when there are diverse opinions or ways to approach an objective	When you need to observe specific work practices When interpersonal or face-to-face interaction is needed to evaluate the "human aspect" of a process
Advantages	Encourages interaction, in-depth discussion and open-ended questions – a flexible style can provide unexpected information	Direct sharing of information on best practice – brings the partners together to discuss a mutually established agenda	Can observe actual practice and verify the process capability, enablers, and assess the measurement system
Disadvantages	Takes time – the people interviewed may be reluctant to talk about sensitive issues	Logistics must be managed – result may be the "lowest common denominator" among the participating partners	Requires careful planning and preparation – who asks what of whom?

introduction into a benchmarking study. Whenever possible, analysts conducting benchmarking projects should have the same education as Six Sigma Black Belts in statistical analysis to assure the analytical soundness of study results.

Benefits and Pitfalls of Benchmarking

Benchmarking is a business change process that encourages managed change. It encourages an organization to take an external and objective perspective in evaluating its performance. The benefit of benchmarking comes from three specific actions:

- The gap between internal and external practices creates the need for change.
- Understanding the benchmarked best practices identifies what must change.
- Externally benchmarked practices provide a picture of the potential result from change.

However, lest benchmarking appear to be a panacea for problem resolution, the following set of potential pitfalls in conducting benchmarking studies must also be highlighted:

- selecting benchmarking partners that do not convince management (not respected);
- choosing benchmarking partners to meet popularity tests with no performance substance;
- accepting public relations claims as process performance benchmarks;
- assuming that measurements are the same in different organizations (without checking);
- identifying process measures that are not traceable from strategic to operational levels;
- conducting statistical analyses that represent surface observations – not root **causality**;
- failure to validate performance with on-site inspection to verify benchmark claims;
- enforcing implementation of a benchmarking lesson across a cultural barrier; and
- use of "benchmarks" for management decisions without recalibration over time.

Comparative Analysis and Competitive Advantage

What does an organization gain in the way of competitive advantage from benchmarking? In the long run, competitive advantage comes from outthinking and outperforming competition. When an organization uses benchmarking effectively, they are able to think ahead of their industry and to act efficiently by adapting lessons learned from cross-industry studies to permit them to creatively imitate the best performing processes in the world. Over the long haul this can establish them as the thought-leader within their own industry. In the final analysis, it is not outthinking or prior knowledge that results in competitive advantage, it is in the excellence of execution of such new knowledge and the creative application of breakthrough insights that wins in the long term. To achieve a dominant position in a market, a company must both know and do better than its most aggressive competitors. Benchmarking can help develop the competence to achieve this position, but it must be supplemented by management will in order to make success happen.

Integrating Benchmarking with Strategic Planning

The leading organizations in the world plan to win and win by planning. Benchmarking improves performance for these organizations by providing them with a methodology to learn and challenge their critical business assumptions by thinking differently about their strategic direction. Applying benchmarking as a tool of business strategy is an effective way to evaluate options and perform an assessment of alternatives by considering the strategic implications that may be observed in other analogous situations. Such lessons reduce the likelihood of "repeating the mistakes of others".

Conclusions

Process benchmarking is an important tool of TQM and can help to improve both the strategic direction and the operational process performance. It is a discovery methodology that is used to stimulate learning and help organizations to think about creative options for the design and implementation of its business processes. Coupled with solid statistical data analysis, best practice identification and cultural adaptation can help organizations to both "learn"

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and "do" their business process improvement more effectively.

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12 Benchmark Processes to Define Improvement Projects

Abstract: Benchmarking is a process of comparing performance between two or more organizations about a product, process or service that they have in common. The benchmarking objective is to identify a process that has superior performance and to determine the reasons behind that exceptional performance. Benchmarking studies may be conducted at either the strategic, or operational organizational level and they may compare competitive organizations, internal divisions or processes, industry-wide practices, or generic business practices in cross-industry studies. Benchmarking follows a four-step process: plan-collect-analyze-improve. In the planning step the objective of the study is defined and a literature search is made to determine what information is available from the public domain. Companies are targeted as partners in the study and a preliminary questionnaire is developed in order to solicit their participation. In the second step of the study surveys are conducted, site visits are accomplished, and interviews are used as part of the data collection process. In the analyze step, statistical and practical comparisons are made and best practices are identified among the participating organizations. In the final step, potential enablers of improvement are culturally adapted to each organization and they are implemented into the daily management system.

Keywords: total quality management (TQM); business excellence; self-assessment; balanced scorecard; customer dashboard; process benchmarking; benchmark; enabler; best practice; critical success factor; process capability; entitlement; strategic benchmarking; operational benchmarking; quality management systems; continuous improvement; *kaizen*; plan-do-check-act (PDCA)

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For the attention of the Editor-in-Chief

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(3)	eqr411	Failure Modes and Effects Analysis	
(4)	eqr218	Confidence Intervals	
(5)	eqr419	Overview of Quality Management	
(6)	eqr163	Data Collection and Data Management in Survey Sampling (in Particular by New Technologies)	
	eqr233	Data Collection	
(7)	eqr491	Design for Six Sigma Creates Organic Growth	
	eqr208	Six Sigma Method	
	eqr421	Six Sigma	
(8)	eqr313	Capability Measures for Measurement Systems Analysis	
	eqr304	Overview of Measurement Systems Analysis	
	eqr302	Measurement Systems Analysis, Attribute	
(9)	eqr487	Calibration	
(10)	eqr433	Causality	

Policy Deployment Drives Performance Improvement

Introduction

Organizations that win in the long term "plan their work and work their plan". Realization of strategy – the long-term vision of an organization is achieved by a disciplined approach to setting direction and then executing that direction through the effective use of the organization's resources. In Japan this method is called *policy deployment* – which has also been called the *secret weapon* in the Japanese management system. Policy deployment is the strategic direction-setting methodology used to identify business goals, as well as to formulate and deploy major (1) **change management** projects throughout an organization. It describes how strategy cascades from vision to execution in the workplace through a collaborative engagement process that also includes implementation details like performance, self-assessment, and management review. It describes a systematic relationship between strategy development and the organization's daily imperative to measure and manage its operations using a system that aligns the actions of its people to produce collaboration among the various business functions and processes to produce requirements for customers.

Historical Development of Policy Deployment

What were the circumstances under which policy deployment originated? Interest in strategy, market focus, and long-term, balanced planning were generated by the visits of Dr. Peter F. Drucker to Japan in the early 1950s [1]. As a result of his teaching, "policy and planning" was added to the Deming Prize checklist in 1958. Bridgestone Tire Corporation first used *hoshin kanri*, the Japanese term for policy deployment, in 1965. In 1976, Dr. Yoji Akao and Dr. Shigeru Mizuno were involved in the implementation of *hoshin kanri* in Yokagawa Hewlett–Packard (YHP) as part of its pursuit of the Deming Prize. By 1982, YHP had used *hoshin* to manage a strategic change that moved it from the least profitable Hewlett–Packard (HP) division to the most profitable. In 1985, this *hoshin* methodology was introduced to the rest of HP as a lesson learned from the YHP Deming Prize journey. From HP this methodology was transferred to other leading companies including Proctor & Gamble, Ford, Xerox, and Florida **Power** & Light, involving several advisors (2) and councilors of the Union of Japanese Scientists and Engineers (JUSE). The work of the GOAL/QPC research committee also extended the managerial technology of policy deployment and was a key ingredient in introducing policy deployment across North America and through multinational companies, to the world [2].

Foundations of Policy Deployment

Mizuno defined *hoshin kanri* as the process for "deploying and sharing the direction, goals, and approaches of corporate management from top management to employees, and for each unit of the organization to conduct work according to the plan". *Hoshin kanri* is a comprehensive, closed-loop management planning, objectives deployment, and operational review process that coordinates activities to achieve desired strategic objectives. The word *hoshin* refers to the long-range strategic direction that anticipates competitive developments while the word *kanri* refers to a control system for managing the process [3].

This management system does not encourage random business improvement, but focuses the organization on projects that move it toward its strategic direction. It builds strength from its relationship with the daily management system that is focused on *kaizen* – continuous improvement. *Hoshin* seeks breakthrough improvement in business processes by allocating strategic business resources (both financial and human resources) to projects that balance short-term business performance to sustain improvement toward its long-term objectives. In a policy deployment management system this two-pronged approach integrates operational excellence in the daily management system with architectural design of its long-term future. This planning process contains two objectives: *hoshin* – the long-range planning objectives for strategic change that allow an organization to achieve its vision and *nichijo kanri* – the daily, routine management control system (or daily management system) that translates the strategic objectives into the

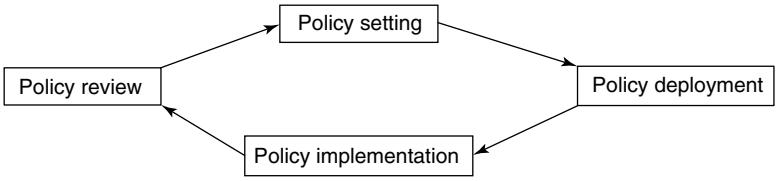

Figure 1 The system of hoshin kanri of managing policy

work that must be accomplished for an organization to fulfill its mission. The blending of these two elements into a consensus management process to achieve a shared purpose is the key to success for the policy deployment process. In a *hoshin* planning system, strategy is observed through the persistence of its vision – how it is deployed across cycles of learning in project improvement projects that move the performance of the organization's daily management system toward its direction of desired progress.

The fundamental premise in policy deployment is that the best way to obtain desired results for an organization is for all employees to understand the long-range direction and participate in designing the practical steps to achieve the results. This form of participative management evolved and was influenced by the Japanese refinement of Drucker's management by objectives (MBO) through the birth and growth of the quality circle movement. To manage their workplace effectively, workers must have measures of their processes and monitor these measures to assure that they are contributing to continuous improvement as well as closing the gap toward the strategic targets. Policy deployment became the tool that Japanese business leaders used to engage their workers in a strategic dialog and align their work with the consensus strategic direction of their firm. When HP first implemented *hoshin* planning, many of its business leaders explained how it worked by calling it "turbo-MBO".

Policy deployment links breakthrough projects that deliver the long-term strategic direction to achieve sustainable business strength while, at the same time, delivering an operating plan to achieve short-term performance. The methods of policy deployment anticipate long-term requirements by focusing on annual plans and actions that must be met each year to accumulate into long-term strength. Policy deployment processes begin when senior management identifies the key issues or statements of vulnerability, where improvement will have its greatest impact on business performance. This perspective is an essential starting point for policy deployment and allows management to focus a strategic dialog to solicit ideas from frontline workers regarding the opportunities for improvement that exist in their workplace. As Dr. Noriaki **Kano** of the Tokyo Science University points out, without such direction "the ship would be rudderless". The communication of the focus area or theme for improvement provides a cohesive direction to assure alignment of the entire organization and to build consensus between the management team and the workers on business priorities. (3)

Hoshin helps to create the type of organization that William McKnight, former CEO of 3M, expressed as his desire: "an *organization* that would continually self-mutate from within impelled forward by employees exercising their individual initiative" [4]. In this type of organization, creativity is managed through a combination of self-initiated improvement projects, which engage teams to combine individual capabilities for achieving strategic projects that make a difference to the whole organization. How does this change management process work at the frontline where these strategic *hoshin* projects interface with the organization's routine work processes?

Perhaps the reason *hoshin kanri* took hold within HP is that this methodology demonstrated its ability to translate qualitative, directional, or strategic goals of an organization into quantitative, achievable actions that focus on fundamental business priorities achieving significant competitive breakthroughs – in short, the leaders at HP recognized *hoshin kanri* as MBO done right![a] The extension of this methodology beyond HP to other leading firms came about because HP was recognized as possessing the best practice for linking its strategic direction with its operational management systems.

Daily Management System

Policy deployment uses a systems approach to manage organization-wide improvement of key business

processes. It combines the efforts of focused teams on breakthrough projects with the efforts of intact work groups who continuously improve the performance of their work processes. All strategic change occurs in projects that accomplish those activities that are necessary to achieve the stretch business objectives that assure sustained success for the organization. Policy deployment systematically plans ways to link strategic direction with those business fundamentals that are required to run the business routine successfully. Policy deployment allows management to commission change projects for implementation and to review the implementation of a system of projects and thereby to manage change. It seeks opportunities disguised as problems – and elevates those high-priority changes required for the improvement of the daily management system and work processes into business change objectives that are accomplished as *hoshin* projects.

Routine operation of the daily management system requires a foundation in management by fact, or the combination of business measurement with statistical analysis and graphical reports that illustrates the current state of performance, historical trends, and is able to extrapolate trends through statistical inference. A key ingredient is the business fundamentals **measurement system** that includes the set of basic process results measures that are monitored at control points within the organization where the flow of its throughput can be managed based on the requirements that are driven (using a pull system) by the customer requirements. This measurement system should include both predictive and diagnostic capabilities. (4)

HP embedded its daily management system into a work process measurement system that they initially called *business fundamentals tables*. Other companies refer to the set of measures that translate strategic goals into operational measures of work (in units such as quality, cost, and time) as either a customer dashboard or a balanced scorecard. These systems are used to monitor the daily operations of a business and to report to the management on the progress in the process for developing and delivering value to customers. This measurement process must operate in close-to-real time to permit process owners to take appropriate corrective action that will limit the "escapes" of defects to external customers by catching and correcting errors before they are released from the organization, and finding and fixing mistakes as they occur at the source. Such measures of core work processes are called *business fundamentals* because they must operate under control for the business to achieve its fundamental performance objectives.

These measures must also be captured at the point where control may be exercised by process operators to adjust the real-time operation of the process and assure meeting the customer's performance requirements on a continuing basis. As the great Dutch architect Miles van der Rohe once observed "God is in the details" and it is in these details that business must effectively operate. A daily management system defines the details of an organization's operations. Thus, the measurement and the point at which it is both monitored and controlled are parts of the daily management system and at this point they must be related to their contribution to deliver organizational performance objectives. In the language of Six Sigma, a "Business Y" (such as "profitable growth") that must be achieved is the strategic goal, while a "Process X" (such as "creditworthy customers") delivers this result by process-level performance through the **transfer function** $Y = f(X)$ and the "X" is therefore a fundamental business measure of the organization's daily management system. (5)

Collins and Porras describe how leading companies stimulate improvement by *evolutionary progress*. "Evolutionary" describes progress that resembles the organic growth or the way that species evolve and adapt to their natural environments. Evolutionary progress differs from the big hairy audacious goals (BHAG) of strategic progress in two ways. First, whereas BHAG progress involves clear and unambiguous goals ("We are going to climb *that* mountain"), evolutionary progress involves ambiguity ("By trying lots of different approaches, we're bound to stumble onto something that works; we just don't know ahead of time what it will be"). Second, whereas a BHAG involves bold discontinuous leaps, evolutionary progress begins with small *incremental* steps or mutations, often in the form of quickly seizing unexpected opportunities that eventually grow into major – and often unanticipated – strategic shifts. Evolutionary progress represents a means to take advantage of unplanned opportunities for improvement that are observed at the point of application – the daily management system. The accumulation of many evolutionary improvements results in what looks like part of a brilliant overall

strategic plan [5]. Both types of change are needed to stimulate the organic growth of an enterprise. If an organization can make improvements in the "right *X*'s" then it will improve its performance on the critical Business *Y*.

Choosing Strategic Direction

Hoshin kanri begins with a process for choosing strategic change. In most firms, this process is called strategic planning. Proposed changes are usually identified to either increase the competitive performance of a process or to create the competitive "attractiveness" of a product to its targeted market. Strategic choice in both dimensions is essential to have a globally competitive organization. As pointed out by Dr. Hiroshi Osada, many Japanese companies have not paid enough attention to the critical aspects of strategy formulation as they have to the deployment of their strategy using *hoshin kanri*. This leads to an error of effectively deploying a poorly chosen strategy. When management confuses the mechanistic aspects of policy deployment with its own crucial obligation to establish strategic direction, then they create a grievous error that is truly an abrogation of leadership. An organization may effectively deploy management's strategic choice, however, if the choice of strategy is not carefully directed it will not lead to improvement [6].

Osada notes that in traditional Japanese management systems, ideas flow "bottom-up" from the workplace to the management. However, in policy deployment, there is also a top-down approach to planning change. As Osada comments, policy deployment "is a simple tool for effectively deploying a given policy, and has therefore been broadly adopted by Japanese industry, it does not aid in policy formulation. Even when employing management by policy (MBP), therefore, the question of whether or not a given policy is appropriate will remain. It is thus possible for an inappropriate policy to be effectively deployed – to a counterproductive effect" [7]. Strategic direction must be determined by discovering the alternatives for achieving the organization's vision and choosing the direction that will accomplish it. This direction is modified through the power of the incremental change to act as the "rudder" that steers the ship by making "finely tuned" changes to the general direction of the strategy.

What are the essential ingredients in choosing strategic direction? This process of management integrates strategic planning, change management, and **project management** with the performance management methods that focus on delivering results. Some specific work activities in designing and implementing a policy deployment system include the following: (6)

- identifying critical business assumptions and areas of vulnerability,
- identifying specific opportunities for improvement,
- establishing business objectives to address the most imperative issues,
- setting performance improvement goals for the organization,
- developing change management strategies for addressing business objectives,
- defining goals project charters for implementing each change strategy,
- creating operational definitions of performance measures for key business processes, and
- defining business fundamental measures for all subprocesses to the working level.

Once a strategy has been set, the next challenge is to align the strategic direction with the work that is being performed in the daily management system.

Aligning Operations with Strategies

A critical challenge for organizations is to align their strategic direction with their daily work systems so that they work in concert to achieve the desired state. Alignment must include linking cultural practices, strategies, tactics, organization systems, structure, pay and incentive systems, building layout, accounting systems, job design, and measurement systems – *everything*. In short, alignment means that all elements of the company work together much like an orchestra leader integrates the various instruments to conduct a coordinated symphony. Organizations that apply the most mature aspects of policy deployment do not put in place any random mechanisms or processes, but they make careful, reasoned strategic choices that reinforce each other and achieve synergy. These organizations will "obliterate misalignments". If you evaluate your company's systems, you can probably identify some specific items

that have misaligned with its vision and impede its progress. These "inappropriate" practices have been maintained over time and have not been abandoned when they no longer align with the organizational purpose. "Does the incentive system reward behaviors inconsistent with your core values? Does the organization's structure get in the way of progress? Do goals and strategies drive the company away from its basic purpose? Do corporate policies inhibit change and improvement? Does the office and building layout stifle progress? Attaining alignment is not just a process of adding new things; it is also a never-ending process of identifying and doggedly correcting misalignments that push a company away from its core ideology or impede progress" [8].

The System for Policy Management

Policy deployment combines both the "target and the means to achieve the target" into a consensus-generating, management decision-making process. Improvement targets are described using four elements: a performance measure to be improved, direction and rate of improvement desired, targeted improvement magnitude, and timeframe for achievement of the target. A means to achieve the target describes a set of specific actions that will be taken to deliver the desired results. These means may differ across the organization, based upon the initial, local management self-assessment, or "current state analysis" that is conducted to assess the business area's starting point for change and determine the magnitude and nature of the performance gap to be closed by the change management or *hoshin* project to deliver the desired state.

Peter Drucker once commented "for full effectiveness all the work needs to be integrated into a unified *program for performance*" [9]. The program for performance is designed by the top management team to provide a specific, effective course of action to achieve its desired results. To achieve these results, all the dimensions of the business must be consistent with each other. This is the job of the policy deployment system.

This system for managing policy consists of *kanri* or control mechanisms that deploy business policy through four essential steps in order to execute management's program for the business direction using a systematic sequence of steps that achieve *hoshin* project objectives within the constraints of assigned resources. These four steps define policy setting (or establishment of *hoshin* projects), deployment (or propagation of these projects throughout the organization), implementation (or integration of the results of change into the daily management system), and review (or assessment of the results achieved from the process) (see Figure 1). These four steps will be described in the next four sections of this chapter.

Policy Setting

Policy setting is a top-down "catchball" whereby management conducts "strategic dialog" with employees to collect ideas and opinions about chronic major problems and their aspirations regarding the business future, and then processes this information in conjunction with environmental data analysis and scenario analysis to formulate the annual business change objectives (which some organization call their *hoshin* projects): strategic change projects (identified by both targets to be achieved and means for achievement). In this phase, organizations recognize the most critical projects that must be accomplished to eliminate vulnerabilities or capture the benefits from potential change initiatives or newly emerging improvement opportunities. For organizations to succeed they must undergo a rigorous analysis of both their fundamental work processes to identify business imperatives (things that must change) and their current strategic direction to determine potential business vulnerabilities from competitive, economic, or technological changes.

This system structures application of continuous improvement into strategic and operational dimensions. David Packard incessantly used the term *continuous improvement* beginning in the early 1940s – it is not a new term – but as Collins and Porras describe its adaptation in leading companies that have adapted to change, they observe that it is an essential structural ingredient in those companies that have been *Built to Last*: "Visionary companies apply the concept of self-improvement in a much broader sense than just process improvement. It means long-term investments for the future, it means investment in the development of employees; it means adoption of new ideas and technologies. In short, it means doing *everything* possible to make the company stronger tomorrow than it is today" [10].

Most organizations operate on three levels of managerial thinking: enterprise thinking assures their long-term viability; strategic thinking focuses on products, markets, and customers; and operational thinking focuses on the daily work that delivers the organization's results. Strategies align to these three areas of focus: "Management strategies can be classified into three types – corporate strategy, business strategy, as well as functional and cross-functional strategy – depending on the level of the corporate organization to which they apply. The corporate strategy, which delineates the fundamental direction of the whole company, is certainly very important for realizing a management vision; but it would be no exaggeration to say that the success or failure of the corporate strategy is determined by the particular business strategies, since it is through these business strategies that the aims of the corporate strategy are actually implemented" [11]. The portfolio of specific strategies that any organization pursues must be managed to deliver the risk – benefit performance desired by the organization in order to achieve its desired results – whether for breakthrough results or just for incremental improvement of a specific business area.

How is this approach to planning conducted? The corporate planning process should deliver increasing business brand value to balance financial risk and reward. This planning process consists of three elements: strategic planning, business planning, and functional planning that must all fit together in an integrated planning system. The strategic planning process is conducted at the enterprise level of the business thinking to identify which business opportunities to exploit and how to sustain the ability of the organization to meet or exceed its annual performance objectives. The business planning process is conducted at the business level of thinking and its objectives are to drive market share to accelerate financial payback, build customer loyalty, and decrease market risk. At the operational level of thinking, the functional planning process improves all process performance to reduce cost, cycle time, and defects while enhancing responsiveness to customers and delivering customer satisfaction.

A business strategy should deliver "visionary" performance: strategy is the persistence of a vision over the long term – and it requires both vision setting and vision deployment to assure alignment in strategic direction. Policy deployment provides direction to guide these plans and assures that the organization moves in a coherent direction. The more robust a plan for required change, the more effective the organization's ability is to accomplish this plan. Robustness is a function of the management team's ability to see beyond its operating horizon and understand what may occur in its planning horizon that requires its focus and attention today.

What is a planning horizon? It is the distance that an organization "sees" into the future to study and understand the potential impacts of events on its policies and prepare it for evolving situations that may impact its current or future performance. Organizations tend to have four distinct planning horizons.

- **Business foresight**

  Managing for the long term to assure that the organization is not surprised by changes in the assumptions that it has made in the design of its business model and product line strategy (focusing on a 3–10-year business outlook).
- **Strategic direction**

  Managing for the intermediate-term changes in technology and competitive dimensions to assure that vulnerabilities in the business model are not exploited and to bridge the chasm that may exist between product line introductions (focusing on the next 3–5 years of business operation, depending on the degree of change that is anticipated in the business environment).
- **Business plans**

  Managing the short-term fluctuations of the market – a planning horizon that delivers against short-term fluctuations in demand or supply (focus on quarterly and annual operating plans).
- **Business controls**

  Managing the current state of a business – a planning horizon that delivers today's performance and assures rapid responses for corrective actions required to sustain advertised service levels (focus on the daily–weekly–monthly–quarterly operating plans to deliver the targeted results in the annual plan).

How is strategic policy formulated? Strategic direction is best established using cross-functional dialog to capture all the inputs of the organization and to build a common direction, based on the consensus of how to boost organizational strengths and overcome organizational weaknesses in the face of

critical business threats to capture the most important market opportunities. Most organizations have just two kinds of strategic decisions: those that may be executed within the areas of their direct oversight of top management (e.g., personnel decisions, budgeting, merger, capital budgeting, etc.) and those that require cross-organizational collaboration for implementation. These cross-functional projects require special attention and project management to realize the objectives of the change initiative. Such change strategies that require mutual consent and collaboration are ideal for a policy deployment system. In addition to planned continuous improvement that is a result of problem solving, continuous improvement may also result from process management, whenever a process is consciously enhanced over time.

Osada encourages strategic engagement of all employees through the following ways:

- recognizing product life stage (product life cycle analysis)
- analyzing business and product position objectively (positioning analysis)
- analyzing competitiveness (competitive analysis)
- perceiving strengths and weaknesses of products (SWOT analysis)
- forecasting future competitiveness using **time series** data (time series analysis) (7)
- maintaining transparency through visualization (visual method); involving all employees [12].

Osada encourages using seven strategic tools (the S-7 tools) in policy setting:

1. environment analysis
2. product analysis
3. market analysis
4. product–market analysis
5. product portfolio analysis (product portfolio management, PPM)
6. strategic elements analysis
7. resource allocation analysis [13].

But, all these tools and methods are employed as staff-directed preconditions for strategic planning in the planning approaches of many Western organizations where they link the three planning systems (strategic, business, and functional) with the business and environmental assessment analyses that precede strategic decision-making. While this linkage may be a bit weaker in Japanese firms, in Western firms, such issues do not appear to be a critical shortfall. However, without complete integration of these planning processes it is difficult to obtain the degree of effectiveness in deployment of shared resources that permits breakthrough achievement to occur. What is breakthrough achievement in management? Breakthroughs represent at least an order-of-magnitude change in performance that is accomplished over a relatively short period of time. Breakthrough is achieved by developing a capability to choose the right objectives for planned change and then aggressively executing these objectives. This requires two factors: identification of what to change and the timing of when to change it. The job of top management is to decide which lever of change must be pulled in order to accomplish the desired result.

Other success factors that are significant in achieving breakthrough plans include the right action to achieve the desired state of change. Right does not mean comprehensive or exhaustive, but it implies a budgeting of energy that focuses an organization on catalytic actions that stimulate organizational response in the desired direction – applying a limited capital budget and the best people to accomplish those important objectives that they have been personally developed to concentrate on. A second success factor in the management of breakthrough projects is the capacity of an organization to convert objectives into results. Excellence comes from execution of plans, not just from planning. To execute, an organization must be mobilized to consolidate their energy and coordinate their actions to achieve shared objectives for the common good of the organization as an organism – a living entity that requires appropriate nourishment and execution of all its bodily functions. A third critical success factor for breakthrough management is the capacity of an organization to integrate specific improvements into standard operating practices that are consolidated across the entire organization for maximum leverage effect. This success factor is based on the existence of a business control management system that holds the gains from improvement projects and is able to assure that performance **degradation** does not occur – people do not slip back into their "old way of doing things", but that they embrace the new methods as their routine way of working. This success factor is addressed in the policy deployment and policy implementation steps. (8)

It should be noted that breakthrough change projects can only be accomplished if the daily work processes are operating under reasonable control. If a business is not operating under control, then the "breakthrough" activity should focus on bringing itself under control before making a significant investment in strategic change. When an organization's daily management system is operating under control, then more time is available for strategic change because management is not "fighting fires" or "expediting execution" of routine work. This requires that the management start this journey by evaluating its readiness to make strategic changes in its operating system.

To maximize the effectiveness of policy deployment, the strategic direction setting and implementation processes should identify the highest priority business process improvement projects and the requirements for accomplishing them. For instance, only some of these projects will require the degree of diagnostic sophistication that is available from a Six Sigma Black Belt while others will require intensive capital investment or software development to accomplish their objectives. Only when management chooses change projects that improve the infrastructure of its business processes – work processes whose performance contributes to the common cause variation of the business performance – can the most significant gains be realized from a comprehensive business improvement effort. How does management achieve this focus? The short answer is that management must put in place the methods to "recognize" their priority business improvement needs by linking their choice of change management projects to the strategic direction of their business so that the portfolio of change management projects drives the policy changes that are necessary to achieve the long-term performance objectives of the organization. Some of the questions that must be addressed during policy setting include the following:

- What is our business and what results do we expect to achieve? How will we know that we have achieved these results? Is this the best we could do?
- What are our assumptions about society, the economy, market and customers, technology, and knowledge? Are they still valid?
- Has anything happened that would change the dynamics of our industry or markets?
- What would change mean for our business position?
- Are there any opportunities that we should anticipate and capitalize upon to our long-term advantage?
- Where should we choose to excel? Can we take action on this opportunity?

Policy Deployment

While policy setting sets organizational policy, the policy deployment step deploys policy change to the organization by changing the way that effective work is accomplished in the daily management system.

How are the *hoshin* or strategic change objectives deployed? Policy deployment is the heart of this policy management system and has received much attention because of the "catchball" approach that aligns the objectives of the organization and then balances work by resource leveling and prioritization of improvement activities. An implementation plan for a change project is a living document – it acts like a compass to guide an organization while allowing employees to take ownership by participating in choices that define the reasoning behind the project as well as the steps in the project's execution. Change projects can identify two types of improvement effort – either by a breakthrough project or by a continuous improvement project – to change the way work process activities function. Breakthrough activities are strategic change projects that make a significant shift in the organization's capability to perform routine operational work processes or deliver products (either goods or services) to the marketplace. Work process continuous improvement (*kaizen*) activities are part of a daily management system that defines how work is accomplished. The *kaizen* change activities are the responsibility of all work process owners. This planning approach focuses on guidelines for major improvement projects (while small incremental or continuous improvements are made through the regular course of continuous improvement of the daily routine work). The distinction between these activities is twofold: first, more of the organization's resources are focused on breakthrough projects, and second, accomplishment of a breakthrough project usually occurs over a multiple-year period (or as a series of coordinated improvement projects). One important management consideration in choosing breakthrough projects is

that the combination of all the annual breakthrough projects (also called the *portfolio of change projects*) will define the steps that an organization chooses for accomplishing strategic change in the range of its midterm planning horizon (1–3 years).

To achieve "saturation" of policy (which consists of both targets and the means for their achievement) in the organization – or complete deployment of change projects within the whole organization that is affected by the defined policy change – and assure collaboration of all the affected work groups, the objectives cascade of an action plan for a particular improvement project must involve not only functional deployment of policy but also engage its cross-functional aspects. It is across the functional seams of an organization where most significant difficulties are encountered and these boundaries represent focus areas for management to assure continuous collaboration in the execution of change projects and consensus among the various functional organizations that engage all the decision-making managers in the areas where the change will have a direct effect. To understand the difficulty that the boundary condition dynamics have, consider what happens as change is managed when organizations shift work activities from internal to external units (e.g., from internal manufacturing to an external contract manufacture). At such boundary conditions, conflicting objectives and political issues of the organizations often can interfere with performance improvement work and it is the job of the management team to eliminate any such barriers to the success of their project team. This also happens within organizations at their functional boundaries.

Catchball is the process that is used to build a consensus through dialog about the targets and means to achieve the change. This process is data driven and uses tools that permit management by facts. Catchball links annual change projects to midrange and long-term plans – deployment prior to annual fiscal year commencement, incorporated into target setting and annual employee objectives cascade; coordinated both vertically within functions and horizontally across processes and negotiated across the processes to allocate resources (competence, funding, and equipment) to achieve the shared and agreed objectives. The catchball process includes four activities:

- building alignment through linked cascade of means
- setting business performance targets and objectives
- cascading business objectives to the workplace (*gemba*)
- achieving alignment of improvement and effective resource allocation.

Policy deployment is a structured, systematic, and standardized process and it has an ability to empower organizations to achieve strategic change. Policy deployment includes a few key elements that assure that an organization is properly and fully engaged in change projects:

- *Policy* – a general rule or operating principle that describes a management-approved process to approach a business condition or situation based on how it chooses to control its work and manage risk. Once the right policy has been determined, then the organization can handle similar situations with a pragmatic response by adapting its policies to the concrete situation that it faces. Truly unique business situations that run counter to the critical business assumptions require the full attention of the senior management team to evaluate how these situations challenge the boundary conditions of the business model and threaten its policies of operations with change that is imposed from externalities. Policies consist of targets and means.
- *Target* – the measurable results that are to be achieved within a specific timeframe for performance. Targets have checkpoints.
- *Checkpoints* – a measurement point that is used to evaluate an intermediate state in the policy deployment process to demonstrate that progress is being made. The data collected at a checkpoint can be reported to management in interim project status reports. The checkpoint of one process is the control point of the next process – the checkpoints and control points work together to formulate a "waterfall" that cascades across the implementation plan flow and is part of the business measurement system.
- *Check items* – check items and process or project variables that are evaluated to enable organizations to understand the causes that contribute to the outcome of a particular policy.

- *Means* – the sequence of actions that an organization will take to implement a policy or choice of the management team that is an outcome of the strategic direction-setting process. Means have control points.
- *Control points* – a point in a sequence of work activities where corrective action may be taken or countermeasures are put in place to resolve a concern or issue that has been identified at a checkpoint.
- *Control items* – control items verify whether results agree with the established goals – does the work demonstrate progress in accomplishments that will enable the final achievement of targets?
- *Deployment* – the process of engaging the entire organization in an appropriate participation in the strategic direction both vertically (within functional areas) and horizontally (across the functional areas) by creating shared ownership of the implementation actions. The entire system of deployment is "connected" from the long-term vision to the daily management activities. The plans are progressively more detailed as they are refined in deployment from the top levels of the organization to the frontline employees and teams. The plan is deployed through an organization by negotiating the means between management layers (levels) as well as across the functional departments. Targets are not negotiated.
- *Catchball* – the joint analysis process that encourages a strategic dialog between levels of organizational deployment is called a *catchball*. The means at one level become the desired outcomes of the subsequent level. This cascading of targets and means establishes the linkage and alignment of objectives across organizational levels. Mutual discussion between the parties – a two-way communication that is both top-down in general direction and bottom-up in adaptation to the workplace using the existing hierarchical management structure and matrix process structure to engage all parts of the organization in the dialog. This dialog is a negotiation process (see *nemawashi* and *sureawashi* below) that arrives at a collective wisdom to develop and refine the implementation plan.
- *Nemawashi* – negotiation – prior consultation to achieve consensus; careful preparation of the roots of a plant for transplantation; and seeking to achieve *wa* or harmony, consensus, and absence of conflict.
- *Sureawashi* – the sharpening of a sword requires four ingredients: a blade, a template for the angle to be produced, oil to ease the process, and a sharpening stone to remove the unwanted material. This analogy is used for policy deployment. The use of data makes the objectives cascade a fact-based process, not just a subjective negotiation process. Mutual consultation occurs between the organizational levels in order to test the feasibility of planned process improvements and to refine any conflicts between the objectives of the organizational layers. This process opens communication channels and establishes both agreement and alignment in the way people work. This dialog is necessary to obtain buy-in and define achievable plans that middle managers are committed to implement.
- *Shibui* – a state of uncluttered, beautifully efficient austerity – the perfect balance or harmony (*wa*) between not enough and too much – used to describe the desired state or vision of a business system.

Peter Drucker quotes the Roman law in order to focus management on the things that are most important: "*De minimis non curat praetor*" (The magistrate does not consider trifles) [14]. This warning to management against what has been called "micromanagement" is a reason for senior executives to focus on the vital few issues that are critical in the business that they manage. If they do not take the time to manage these important things, then no one else will. If they choose to spend their time focused at the detail level of project execution, then they will squander a more effective use of their time on those vital activities that engage the higher thinking levels of the organization that cannot be reasonably delegated to others for effective action. Management must work on a long-term planning horizon in order to deliver sustained organizational strength. It must also review current actions to assure that short-term profitability is being achieved. But, whenever management spends more time on the short-term issues than it does on the long-term ones, it sacrifices future strength in favor of current results – and displays to the entire organization its lack of trust in the ability of the organization to perform its daily work. This behavior signals to the entire organization that a crisis exists and reinforces

stagnation as the workers wait for the top management to intervene and make the decisions that they should more properly make. A very important benefit of an effective policy deployment system is delegation of appropriate decision rights to the proper place in the organization where the best information exists and where action will be taken to implement that decision.

Some of the questions that are addressed during policy deployment include the following:

- What are the consequences of not doing this project?
- What are the risks inherent in this project?
- What will happen to the business if this project does not succeed?
- What will success in this project commit the business to?
- How does this project add to the total economic results of performance?
- Have we assigned our best people to work on breakthrough opportunities?
- Have we communicated clearly and taken into consideration all objections before chartering the project?

Policy Implementation

Policy implementation consists of the execution of the project plan – both the actions taken by the team involved in the change and the in-process management reviews. All change is implemented on a project-by-project basis according to management's priorities and the logical sequence for attacking each opportunity for improvement. The project plan typically will use a Gantt chart to assign clear responsibility for each improvement item in the implementation plan and to record its activity progress in accomplishing the project subtasks. Senior managers should also conduct regular progress reviews of each change project to monitor team progress in improvement, assure that the projects advance, and eliminate any possible barriers, roadblocks, or bottlenecks that restrict the project's advancement. Senior management should also monitor the execution of the change projects that they sponsor to assure that these projects will deliver the desired gain in the daily management system. If the project review indicates that insufficient progress is being made, then they can develop some countermeasures or reallocate resources so that appropriate corrective actions are taken to assure continued progress.

Another activity that occurs during the policy implementation is publication of information about the ongoing change projects so that the entire organization is informed of the actions being taken to improve performance. This communication can help the organization to align other activities with progress being made on these strategically focused change projects. As a guideline for communication, the management should inform all involved parties of any changes to the change project team's mission, vision of the outcome, guiding principles, or objectives. If the management team communicates effectively and often, then it will translate the planning rhetoric into action realities. Peter F. Drucker observed that "The most time consuming step in the process is not making the decision, but putting it into effect. Unless a decision has degenerated into work it is not a decision; it is at best a good intention" [15].

Some of the questions addressed during policy implementation include the following:

- Have we placed the right people in the right jobs to give the project the best opportunity to succeed?
- Does this project team have everything that it needs to get the job done?
- Are all the people who need to know about this project being informed?
- Are all the right actions across the organization being taken to assure success?
- Is this project implementation the best utilization of the knowledge and ability of the organization's people?
- Does this project implementation make the best overall contribution from use of the organization's limited resources (people, time, and money)?

Policy Review

As the annual cycle of change projects nears completion, results of project implementation efforts should be evaluated to determine performance against targets, shortfalls from expected performance, completion rate, and causes for both under- and over-achievement. Specific action must be identified to compensate for performance deficiencies and prevent recurrence of such problems in future change management projects. Diagnosis of the performance of

the policy planning process is conducted to drive improvements in planning systems. "Feedback has to be built into the decision to provide a continuous testing, against actual events, of the expectations that underlie a decision" [16].

Policy review is accomplished in two ways: through management self-assessment (by senior managers as well as by local managers evaluating their activities to determine where they have opportunities for improvement: either performance enhancements or problem resolution) and through operating reviews of the results produced by the local organization where senior managers identify areas where results are not aligned with expectations for performance. Policy review applies two subprocesses to perform these duties: performance review and business measurement.

Aligning Objectives through Performance Review. The review process seeks to identify conformance to plans (e.g., is there any shortfall or overachievement in targets?). Once nonconformity is identified, then the root cause of the deviation is discerned to determine an appropriate response to the out-of-control type of condition. Both corrective actions and countermeasures are identified to realign the process and assure that process integrity and stability are achieved in the business control system. The following actions may be taken in response to an out-of-control condition:

- emergency countermeasures to alleviate the immediate issue, concern, or problem;
- short-term corrective action to prevent the specific problem from recurring; or
- long-term preventive action to remove problem root causes and mistake-proof the process making a permanent solution and preventing the problem from recurring.

The review step facilitates organizational learning by examining problem areas and critical success factors to discover what directional shifts need to be accomplished in order to achieve the desired end state or vision of the business. Strategy is the persistence of the vision – achieved one project at a time through exercising constancy of purpose in the business planning process. These project reviews are conducted to assess achievement relative to the following planning elements:

- change project objectives
- business planning objectives and corporate commitments
- business improvement plans
- economic plans and projections
- customer requirements and expectations
- competitive performance analysis
- business excellence self-assessment.

Questions addressed during this policy review include the following:

- What results have been demonstrated from this project?
- Which results were expected and which results were unexpected?
- What will this project's outcome do for customers?
- What have we done well that our competitors have done poorly?
- What have we done poorly that our competitors seem to have no problem with?

Business Control and Management Responsibility. The ultimate objective of MBP is to establish a reliable organization – one that creates predictable results through the effective coordination of value-adding work that customers perceive as meeting their needs. In this environment, all employees are aware of their personal contribution to the objectives of the entire organization and are able to make local choices that are aligned with the strategic direction because they understand how the strategy affects their work and *vice versa*. To assure that these local decisions are aligned with strategic direction, it is the responsibility of the management team to develop a measurement system that provides employees with the visible line of sight from their work activities to its contribution to strategic direction. In this measurement system, it is essential that causal linkages (e.g., built using a Six Sigma $Y = f(X)$ transfer function) be established so that effective control can be executed at the local operating level.

Benefits of Policy Deployment

A policy deployment system orchestrates continuous improvements with breakthroughs to assure that the organization attains its long-range goals. Those elements of long-range plans that can be achieved

in a one-year period are identified and become the focus or "vital few" goals to be achieved during that year. Policy deployment plans the way that change is implemented in an organization's daily management process. Accomplishments of such a planning system include

- communicating the vision required for sustained success,
- identifying and choosing breakthrough activities or projects required for the vision,
- orchestrating the direction of an organization's change,
- developing plans and projects that support the business objectives,
- aligning the organization's change efforts both vertically and horizontally,
- ensuring that the plan is effectively and efficiently executed,
- reviewing the progress in executing plans,
- changing plans when it is proved necessary to achieve targets,
- learning from the experience of planning and executing.

"If you can think of new methods to preserve the core, then by all means put them in place. If you can invent powerful new methods to stimulate progress, then give them a try. Use the proven methods *and* create new methods. You must do both" [17]. The imperative for organizations that endure is to do both breakthrough improvement and evolutionary improvement – both change management and routine management – at the same time. This is what Collins and Porras call "the genius of AND" – an inclusive approach to planning and executing change that requires organizations to embrace both aspects of change simultaneously.

The most important thing about priority decisions that face a business is that they are made and communicated deliberately and conscientiously. In a system of MBP, all the important decisions are visible and there is an opportunity for dialog to guide these decisions into the direction that the organization, as a whole, is influenced by the knowledge of all its members. In such a system the key decisions that drive toward its common goals are not made haphazardly, but with the full awareness of the organization. Such open decision processes elicit cooperation of the entire organization in the implementation and review of its activities to assure that it will be able to meet its desired outcomes. The responsibility of the management is to put in place a system of decision-making that generates this degree of collaborative work toward the common end.

Criticisms of Policy Deployment

Despite their application in many leading companies, policy deployment systems have been criticized for their mechanistic use of forms and templates that some see as restricting individual creativity. Some also believe that these planning systems lack strategic emphasis and do not engage the full organization as participants in strategy formulation. Osada summarizes the shortcomings of policy deployment as observed in some Japanese companies.

1. It is difficult for those at the middle management level and below to understand the process of formulating strategic policy. Compared with [editor note: the process for] policy deployment, the process of policy formulation is unclear [editor note: poorly understood and communicated] an indication of management's view that such form of communication is of little value.
2. Strategic policy is ostensibly based on the long-term interests of the firm, but there is no way to judge whether a policy is appropriate, or even truly 'strategic' [editor note: in the essential nature of the policy itself].
3. Several problems in formulating a long-term strategic plan are not addressed, for instance:
   - 3a. Changes in operating environment and other uncertainties are not adequately accounted for; possible difficulties are therefore not foreseen.
   - 3b. Positioning of business is not perceived objectively. The question of whether business aims are optimum and clear is not addressed.
   - 3c. Only one part of the staff, at the top level, participates in strategic policy formulation; it is therefore difficult to judge whether a policy reflects the reality at the "front line" of operations [11].

It must be observed that not all of these objections are strongly negative. Organizations must ask if they must really involve frontline employees actively in formulating strategy. Nokia Mobile Phones uses a current state analysis for self-assessment of frontline operations and then rolls this data into their

strategy-setting process. They also create a "strategic dialog" that builds participation of midlevel managers in conversations about strategy. Other organizations open communication lines through email forums and internal surveys. In such instances, the objection is not critical to the total impact of policy deployment implementation. Additionally, any argument that says "Every employee should have an *interest* in matters of strategic policy" is a very different argument than saying that every employee should be actively involved in *formulation* of business strategy. Satisfying employee interest in strategy can be addressed by improving communications. Also, a broad involvement of employees in formulation of strategy increases risk of inappropriate public statements or inadvertent disclosure of the company's strategy in venues where competitors may discover sensitive information that can be used against the organization. Whenever this occurs, a company loses its competitive advantage. The challenge for management is to build a strong consensus, without risking disclosure of their strategic direction to competition. It is another challenge of the management to balance these concerns in a way that is appropriate to their way of working and business culture.

Summary

Policy deployment, when coupled with a statistically based business measurement system, has been observed in several leading companies to create a robust management process that engages an entire organization in the strategic planning process. It assures line of sight from the strategic goals of the organization to the operational tasks that workers perform at the front line as they do the work that produces the organization's goods or services. The nature of this process can be described using the term "robustness" – a statistical state in which a process is able to accept variation in its inputs, without influencing the variation of its outputs. Such a process is capable of performing consistently – delivering consistent results according to its design intent. Because policy deployment engages the workforce in achieving its common goal of sustained success, this methodology has become a strategic tool for assuring sustained competitive advantage over current and potential business rivals.

Sustained success must be "dynamic" to achieve its enduring state. That is, it must provide continuous advantage despite changes in the environment, regulatory shifts, technological breakthroughs, or competitive market. Anticipating potential actions by rivals is critical to delivering sustained success. To enjoy such sustained success, an organization must master the skills of priority setting and project management to assure that they effectively define and deploy the right initiatives that result in sustained success. Advantage means staying ahead of rivals and this requires that organizations not only make continuous improvements but also use "breakthrough" opportunities to distinguish themselves in their marketplace as a differentiated provider of products and services. This type of management requires managerial competence in three areas: business vulnerability analysis, action planning administration, and operational excellence. The best implementations of policy deployment will engage its employees in the strategy-setting processes as well as the organization's change management process.

End Notes

[a.] It must be noted that Peter F. Drucker initially discussed MBO in Japan in the mid-1950s. Drucker taught management concepts to the Japanese along with Dr. Joseph M. Juran and Dr. W. Edwards Deming. At that time Dr. Juran and Dr. Deming worked in the Graduate Management School of New York University under the supervision of Dr. Drucker.

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GREGORY H. WATSON

16 Policy Deployment Drives Performance Improvement

Abstract: Policy deployment is a Japanese-originated management process that applies the Deming cycle of plan-do-check-act (PDCA) to the processes of planning and execution. Policy deployment has sometimes been called *management by objectives* (MBO) *on steroids* or *Turbo-MBO*. A policy deployment process coordinates the definition and implementation of strategically important business-process-change projects to improve the routine operating processes of an organization. Policy deployment aligns and coordinates the activities of the organization through a number of mechanisms that open lines of communication across the organization in cross-functional and cross-layer dialogs. These communication mechanisms solicit ideas for making business improvements, define projects and objectives through an interactive "catchball process", and review progress through cross-layer improvement project assessments. This in-depth involvement of the entire organization in both the planning and execution processes creates acceptance for change through the active participation of an engaged workforce. Synonyms for policy deployment include *hoshin kanri* (the original Japanese name) as well as policy management and management by policy (MBP).

Keywords: total quality management (TQM); *hoshin kanri*; policy deployment; *nichijo kanri*; checkpoint; control items; check items; catchball; daily management system; benchmarking; self-assessment; business excellence; quality management systems; *kaizen*; continuous improvement; plan-do-check-act (PDCA); management by objectives (MBO); management by policy (MBP); design for Six Sigma (DFSS); define-measure-analyze-design-verify (DMADV); define-measure-analyze-improve-control DMAIC)

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For the attention of the Editor-in-Chief

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