



A Peer-Reviewed Publication of the Quality Management Division of the American Society for Quality

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New and Proven Approaches to Continual Quality Improvement



By Beth Cudney, PhD, Guest Editor

The QMD is partnering next year with the Statistics Division to host a conference called the Institute for Continual Quality Improvement. For this special preconference edition of the *Quality Management Forum*, several experts were invited to submit articles on topics related to the theme of “New and Proven Approaches to Continual Quality Improvement” and its importance to organizational excellence. Continual improvement implies prolonged, repeated instances of quality improvement illustrated by an ongoing sequence of improvement projects. Quality pioneer Joseph M. Juran admonished us long ago that “quality improvement happens project by project and in no other way.”

The authors' areas of expertise include quality management and process improvement in diverse fields. The common threads that link these articles are management principles, strategies, and continual improvement processes to enable managers, practitioners, analysts, and researchers to achieve more effective approaches to improving quality. Each article highlights the need for data-driven decision-making to achieve breakthrough quality improvement.

Dr. Sandy Furterer is developing and deploying the Enterprise Performance Excellence program for Holy Cross Hospital in south Florida. She discusses designing an Enterprise Lean Six Sigma program to help enhance the success of the program. She describes the key components of an Enterprise Six Sigma program that are critical to creating an organizational culture that makes fact-based decisions and continually improves processes across the enterprise.

Dr. Cassandra Elrod, assistant professor at the Missouri University of Science and

Technology, discusses an operationalized approach to implementing and measuring quality management based on Deming's 14 Points. This approach provides a guided method of where to start to employ quality management principles and a method by which to measure the outcomes of these efforts, make improvements in their implementation, and maximize a positive outcome.

Mr. Glenn Mazur, President of Japan Business Consultants, Ltd., describes the Blitz QFD® concept that enables developers to focus their efforts on the most important customer needs to ensure that all downstream functions are aligned to deliver value in the final product. This concept provides a streamlined approach that replaces the large, comprehensive data sets while still providing development, build, and delivery. The approach satisfies customer requirements with competitive products and a reduced development cost.

The team of Dr. Connie Borrer, Tom Beechy, Dr. Dan Shunk, Mike Gish, and Dr. Douglas Montgomery discuss a case study involving TASER, which experienced tremendous market growth leading to a larger international customer base and new environmental operating conditions. As a result, several quality issues and challenges arose across the enterprise and supply chain. The article describes the culture change that was necessary in order to achieve a new level of thinking and to make quality a priority.

I am very honored to serve as the guest editor for the Fall 2011 *Quality Management Forum*, and I hope you enjoy reading the articles. Please feel free to send me your feedback at eachx8@mst.edu.

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Chair's Message

By Jd Marhevko

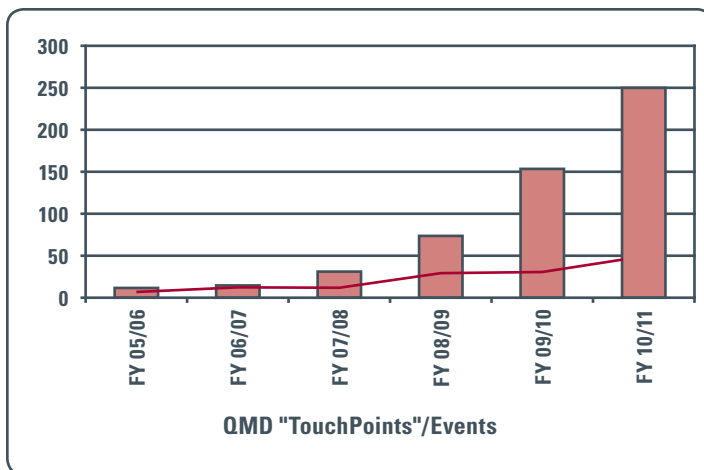


What's a TouchPoint? For every QMD member that renews his/her membership, the Division receives about \$10 to help meet the strategic objectives we've developed, based on your input. Essentially, we've heard two key themes:

1. Provide us with more learning materials
2. Help us to network more

This is true Voice of the Customer at work. We continue to gather this information through surveys on the ASQ-QM.org website, at conferences, through ASQ's member surveys, and through quick five-minute phone call meet-and-greets with new members.

So, back to a TouchPoint. For the QMD, a **TouchPoint is a learning opportunity provided to QMD members and the community at large.** When our council first began assessing how effective we were here, well...let's just say that we had room to grow. TouchPoints include the issue of QMF that you're reading right now. They include free webinars co-hosted with other divisions, e-Blasts with free content developed by our technical committees, dozens of free training podcasts and content available on the QMD website, support and mentoring to sister divisions and sections, free education via speaking engagements at sections/division events, global ASQ partners and, as



requested from within the community, hands-on sessions and courses held at conferences (some not so free), and much, much more. As we've listened and responded to you, our customers, we've grown our TouchPoints to over 250; that's almost 100 more than last year! (See graph.) And as these activities have crossed the breadth of virtual, face-to-face, and print venues, we hope that ALL of you believe that we are working hard to add value for you, so that we can continue to earn your membership.

Now let's transition from the "touchy feely" into networking. Hmm, with more than 23,000 global members, how can we all do that? Under the tutelage of the incoming Chair Elect, Milt Krivokuca, the QMD is creating a plan for supporting and/or co-hosting over SIX regional events across North America. Please note which of these events may be happening near you over the next 12 months:

- **October 15, 2011**—QMD Sponsored 4th Annual Quality Day at Cal-Poly Pomona with the Los Angeles, San Gabriel and Inland Empire sections.
- **October 27–28, 2011**—The QMD will partner with the Audit division for their annual conference in Reno NV.
- **October 28, 2011**—The QMD will help sponsor an Annual Quality Day in Irvine CA with the ASQ Orange Empire section.
- **April 24–25, 2012**—The QMD will help sponsor the Boston MA section's 32nd annual Quality Conference, nationally known as BOSCON.
- **April 28, 2012**—The QMD will help sponsor the ASQ Toronto Canada section's Quality Day.
- **May 21–23, 2012**—The QMD will again partner with the Statistics division to provide hands-on training sessions via a conference-within-a-conference venue (aka Institute for Continual Quality Improvement) at ASQ's World Conference on Quality Improvement (WCQI) in Anaheim CA.

FALL 2011

Our council is in the midst of heavy preparations for the 2011-2012 year of providing you, our membership, with relevant, value-added learning *and* networking opportunities. You can find out more about these opportunities at your QMD website at www.asq-qm.org. You can also visit or join our Linked-In, Twitter and Facebook sites, which will be managed in parallel to these activities. This will enable the virtual website to continue to provide you with even more knowledge and support materials.

Heather McCain, our current past-Chair, is our Conference Chair. Heather, along with some of our key movers and shakers like Ellen Quinn (VC of Marketing), Mike Ensby (Program Chair), Thane Russey (Courses Chair), Steve Bogar (Sessions Chair), Anne Moyer (Arrangements Chair), and dozens of others, are working hard to help to develop these multiple sources of learning and support.

These events have had many talented professionals submit papers, workshops, and courses which include practitioners from cross-cutting industries including logistics, medical, retail, manufacturing, education, the military and more. These venues offer many learning opportunities related to proven approaches, valuable tools, and successful strategies for achieving excellence through "New and Proven Approaches to Continual Quality Improvement."

As such, several experts were invited to submit articles on a topic of their choice related to this theme and its importance to organizational excellence. Continual Quality Improvement implies prolonged, repeated instances of quality improvement illustrated by an on-going sequence of improvement projects. Please remember that you can also view this *and* previous issues of the QMF at <http://www.asq-qmd.org/qmd-forum-newsletter>.

I hope that you enjoy this special edition of the *Quality Management Forum* and find that its content and the continued efforts of the QMD Council provides you with an effective value proposition that exceeds \$10 from your annual dues!

Please keep in touch and e-mail any comments or suggestions to me at Jd.Marhevko@Frontier.com.

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Call for Papers

Institute for Continual Quality Improvement Proven Solutions for Continual Quality Improvement

Sponsored by ASQ's Quality Management and Statistics Divisions
Held Jointly with the 2012 World Conference on Quality Improvement
May 21-23, 2012 in Anaheim, CA



Continual Improvement

Continual implies prolonged repeated instances of quality improvement illustrated by an on-going sequence of improvement projects. Quality pioneer Joseph M. Juran admonished us long ago that "quality improvement happens, project by project and in no other way".

Description

We invite you to submit proposals for presentations and workshops at this institute. The purpose of this institute is to engage managers, practitioners, analysts and researchers in a dialogue that produces more effective approaches and processes to improve quality. Topics for improving quality will include:

- Management principles
- Strategies and processes for improving quality
- Risk Management
- Organizational Excellence
- Data driven decision making
- Case Studies
- Statistical thinking and engineering

Papers, presentations, and workshops will target participants at the Introductory, Intermediate and Advanced levels.

Presentations will feature new approaches and case-studies that illustrate effective principles. The workshops will be learning opportunities that involve active personal involvement. We are targeting sixteen 45 minute presentations and twelve two-hour workshops. In 2011, the institute had an attendance of 1263 persons at 28 presentations.

Format

Prepare your proposal using the following format to

- Title of presentation
- List the authors including their names, affiliation, telephone number, mailing address and email address
- Name of presenter(s)
- Key words or phrases
- Presentation description (maximum of 150 words)
- List presenter biographies (maximum of 200 words each)
- Abstract (maximum of 1000 words)
- Session preference, i.e., presentation or workshop
- Target audience, i.e., introductory, intermediate or advanced

Submit papers at qmd.icqi@gmail.com by Oct. 2, 2011.

Designing An Enterprise Lean Six Sigma Program

By Sandy Furterer, PhD

Unless a Lean Six Sigma program is well designed and embraced throughout an organization, there is very little chance of sustained, enterprise-wide success that aligns to customers' needs and to the strategic direction of the organization. Many times Lean, Six Sigma, and other quality and productivity tools and problem-solving methods are introduced into an organization through a grassroots effort, starting in one (or a few) departments in an organization, but not from the commitment, planning and coordination of top management. Designing an enterprise-wide Lean Six Sigma program based on top management's support and their development of a purposeful vision is critical for the success of the program. The process of creating a Lean Six Sigma program throughout the organization will be referred to as an Enterprise Lean Six Sigma. Based on the literature as well as my own experience, this article provides practical guidance for designing your Enterprise Lean Six Sigma program.

Lean Six Sigma is an approach focused on improving quality, reducing variation, and eliminating waste in an organization. It combines two improvement programs, Six Sigma and Lean Enterprise. Six Sigma is a quality management philosophy and methodology that focuses on reducing variation; measuring defects (per million output/ opportunities); and improving the quality of products, processes, and services. The concept of Six Sigma was developed in the early 1980s at Motorola Corporation (Harry & Schroeder). Six Sigma became popular in the late 1990s thanks to General Electric Corporation and their former CEO Jack Welch. Lean Enterprise is a methodology that focuses on reducing cycle time and waste in processes. Lean Enterprise originated at the Toyota Motor Corporation as the Toyota production system and increased in popularity after the 1973 energy crisis. The term "Lean Thinking" was coined by James P. Womack and Daniel T. Jones in their book, *Lean Thinking* (Womack & Jones). The term "Lean Enterprise" is used to broaden the scope of a Lean program from manufacturing to embrace the entire enterprise or organization (Alukal, 2003).

The key components in an Enterprise Lean Six Sigma Program are shown in Figure 1. Many of these components are the same elements that are part of a quality management system (Baldrige Performance Excellence Program). I will discuss each key component how they all can be used to design an effective Enterprise Lean Six Sigma Program.

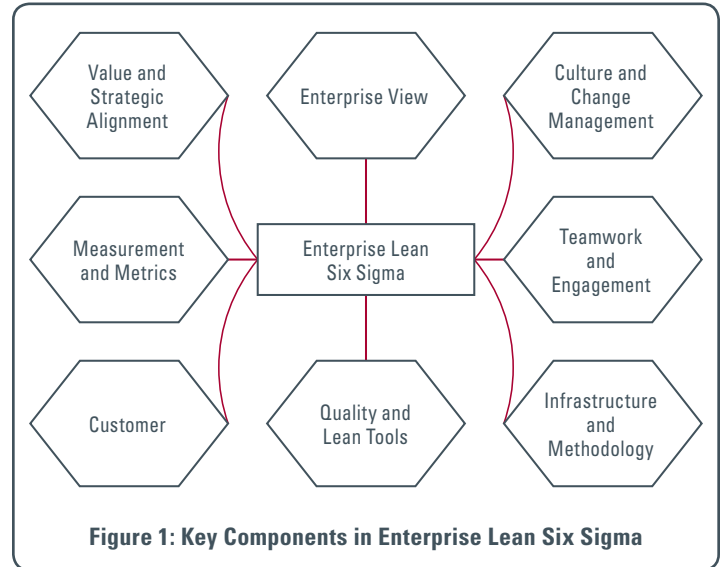


Figure 1: Key Components in Enterprise Lean Six Sigma

Key Components

Value and Strategic Alignment

The value proposition is used to "sell" or otherwise convince management of the value of implementing an Enterprise Lean Six Sigma program. Lean Six Sigma can provide value by:

- Reducing or avoiding costs of providing products and services. One example of avoiding costs is the ability to *not* hire additional staff or resources due to streamlined processes and the release of additional staff capacity.
- Helping to better understand and satisfy customers' needs, including both internal and external customers, as well as partners, suppliers, and collaborators.
- Improving processes to innovate processes, eliminate waste, improve quality, and productivity, and reduce variation.
- Identifying improvement efforts that align with the organization's strategic goals.

Enterprise View

It is important to eliminate departmental silos when improving processes, or else suboptimization of processes can occur. A body of knowledge from systems engineering, Enterprise Business Architecture, focuses on modeling the key concepts and elements of the enterprise by aligning the business strategies and enabling processes to optimize the key groups of activities that enable optimized Information Technology *and* process improvement initiatives.

I have created a model, the Strategic Business Process Architecture (SBPA), to create an enterprise view of an organization's processes, people, and technology that will enable performance improvement. A simplified view of the key elements of the SBPA is shown in Figure 2 (Furterer, 2009; Furterer, 2012). The elements of the SBPA describe the business system enterprise. The SBPA includes understanding the customers and their expectations. Another important element of the business architecture is documenting the business's strategies and goals. The goals should relate to the capabilities that the business requires to meet its goals. The value chain comprises activities that provide value to your customer (Porter, 1985). The value chains are decomposed into the business functions. Each value chain and the subsequent business functions will be used to further decompose the processes. This ensures traceability to value chains that provide customer value. The business capabilities enable the business functions. The business processes and their activities describe the sequence of activities that enable the business to meet the customer's expectations and provide value through the value chains. Applying Strategic Business Process Architecture enables performance improvement across the entire enterprise, focused on the strategic direction of the organization.

Culture and Change Management

This component incorporates the cultural and change management aspects of the organization related to the Enterprise Lean Six Sigma program. It includes developing a change strategy that addresses how to change the culture to focus on continual improvement and measurement, focusing on the customer, the

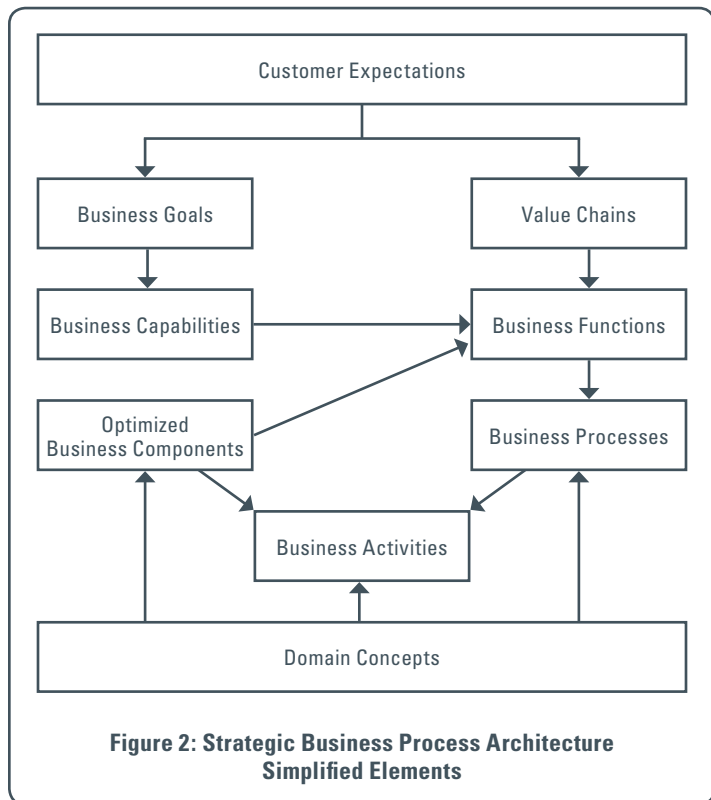


Figure 2: Strategic Business Process Architecture Simplified Elements

technical, political, individual, and organizational elements of change. A communication plan and strategy can be developed to address how to help the stakeholders become less resistant to change. The inherent structure of the DMAIC problem solving approach—and the focus on data and measurement—helps with the culture and change management component. The project management components of Lean Six Sigma—along with clearly defining the mission, vision, and goals of the Lean Six Sigma projects—also help with changing the culture to embrace quality, productivity, and continual improvement.

Also important to help change the culture is to thoroughly and continually communicate the status of the Lean Six Sigma effort and projects. Such communication can include formal project kick-off meetings where the mission, vision, and goals of the Lean Six Sigma program and projects are discussed. At the beginning of the program and projects, it is critical to identify and communicate the mission, vision, values, goals, roles, and responsibilities of the projects and the project teams. Throughout the projects, it is important to provide continual status of the projects through periodic status meetings and reports so that the organization is aware of the successes and take-aways from the projects.

It is also important to show that the senior management team is committed to leading and owning the Lean Six Sigma effort. The CEO, senior management team, and the project champions should show their constant and continued commitment and support to the Lean Six Sigma effort. The project champions should be trained with an understanding of the Lean Six Sigma methodology and tools and should spearhead the project effort and remove obstacles and barriers to successful implementation. Project champions should be at a Director level or above, be well respected in the organization, and be willing to advocate for change.

The Kotter change model (Kotter, 2011) can be followed to implement improvements and manage change within an organization's Enterprise Lean Six Sigma program.

Teamwork and Engagement

Quality and process improvement programs such as Total Quality Management (TQM), Business Process Reengineering (BPR), Six Sigma, Lean, and Lean Six Sigma incorporate elements to address managing the people in the organization. They advocate empowering employees to make (and be accountable for) decisions about their processes. They include training, education, and providing the right skills for people to do their jobs. The Lean Six Sigma program is based upon a team structure wherein team members solve problems together. This component also includes rewarding and recognizing employees for their involvement on project teams, their teamwork and efforts, and their successful implementation of process and financial improvements, as well as for meeting the goals and objectives of the project. Appropriate resources should be engaged and committed to the problem solving teams, where

(DESIGNING AN ENTERPRISE LEAN SIX SIGMA PROGRAM, continued from page 5)

it is part of their regular duties and activities to improve the processes, not based on a voluntary after thought, or “if they get the time” to improve processes. Successful organizations don’t send their staff home when volume or demand is low; they engage them in problem solving teams, projects, and activities.

Infrastructure and Methodology

The infrastructure and methodology component provides the structure to support the Lean Six Sigma effort. It includes defining a methodology for the problem solving and improvement effort (DMAIC). It includes having visionary and committed leadership as a critical element of success. It includes incorporating a project management structure to ensure that the projects are successful and move continually toward implementation. This component also includes developing a communication plan to communicate the mission, goals, objectives, and progress of the Lean Six Sigma program and projects.

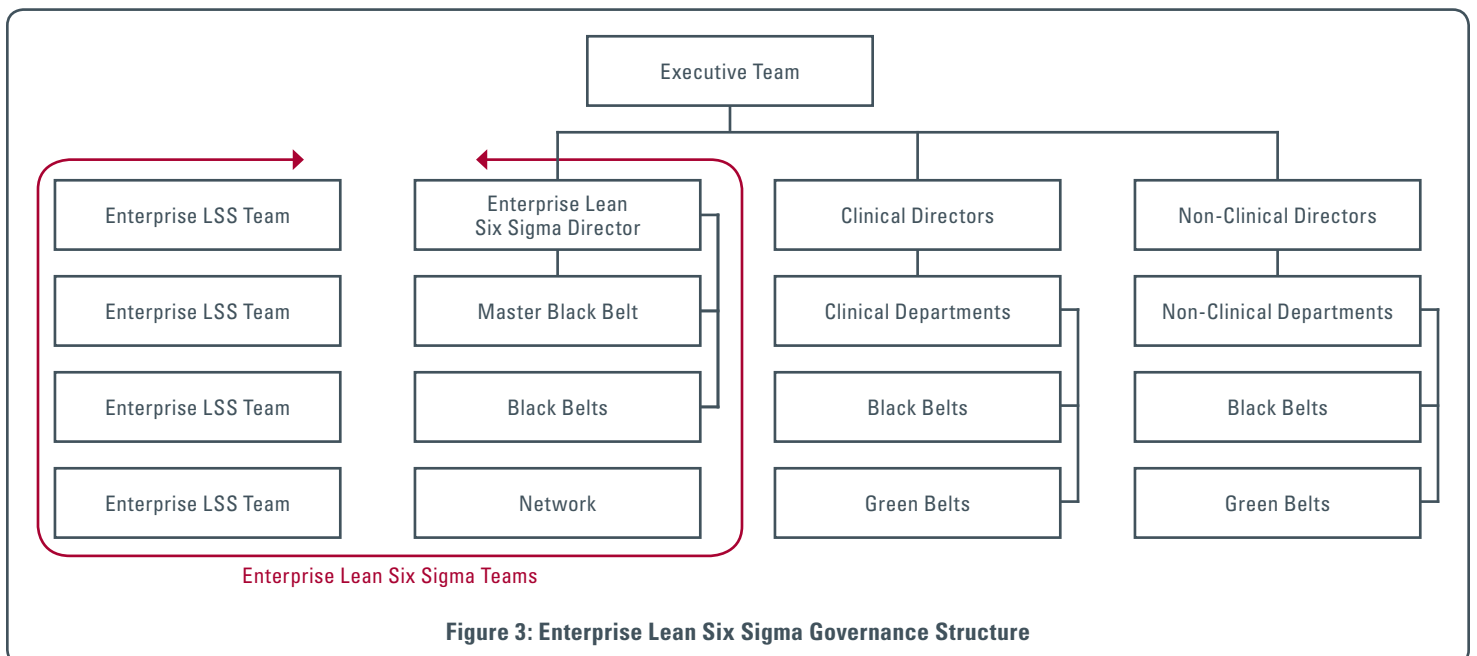
Selecting the appropriate problem solving methodology and tools is important, and the infrastructure component also includes how to organize the Enterprise Lean Six Sigma program and define the reporting structure. An example of a governance structure for a healthcare organization is shown in Figure 3. It includes an Enterprise Lean Six Sigma department consisting of a Director, a Master Black Belt, and Black Belts that mentor Enterprise Lean Six Sigma teams. The team also facilitates major cross-functional and enterprise-wide improvement efforts. The clinical and non-clinical departments have trained Green Belts and Black Belts that work on the Enterprise Lean Six Sigma teams. The Enterprise Lean Six Sigma department facilitates the ELSS network. The mission of the network is to share best practice processes, practices and projects across the organization.

Quality and Lean Tools

Quality and Lean tools are valuable techniques for solving problems and improving the quality and productivity of the processes. Major Lean tools are the Lean Wastes, the 5S, Why-Why Diagrams, standard work, Kaizen, and visual control. Some common Six Sigma tools are process mapping, cause-and-effect analysis, stakeholder analysis, project charters/project management, SIPOC, statistical analysis, Quality Function Deployment, dashboards and scorecards, mistake proofing, Failure Mode and Effects Analysis, improvement plans and control plans. Figure 4 shows many tools used in Lean Six Sigma by the DMAIC phase, where it is most commonly used (Gitlow and Levine, 2005; Pyzdek, 2003; Brassard and Ritter, 2001; Certified Six Sigma Black Belt Primer, 2001)

Customer Focus

Defining the customer of the processes, products and services in an organization can be quite complex. Defining the customers depends upon the scope of the Lean Six Sigma projects and upon which processes are part of the improvement effort. It is important that the project team agrees as to who the customer is for the different projects and components of the processes. It is important to engage the different customer and stakeholder groups to understand their “voice” and their requirements with respect to the services that they receive, which are provided by the processes that need to be improved. Customer satisfaction surveys can be valuable tools in capturing the voice of the customer. Some organizations are creating customer advisory boards that are used as an ongoing tool to derive customers’ requirements. Customer grievance and complaint data are also tools for capturing what needs to be improved. It is important to collect the complaints in a way (database) that can be trended, to identify improvement areas, and assess whether or not improvement has taken place.



Define	Measure	Analyze	Improve	Control
<ul style="list-style-type: none"> • Project Charter • Stakeholder Analysis • SIPOC • Process Map (high level) • Communication Plan, Resistance • Project Plan • Responsibilities Matrix • Items for Resolutions (IFR) • Ground Rules 	<ul style="list-style-type: none"> • Process Map • CTS • Data Collection Plan • Quality Function Deployment (QFD) • Pareto Chart • VOP Matrix • Gauge R&R • Cost of Poor Quality 	<ul style="list-style-type: none"> • Cause & Effect Diagram • Why-Why Diagram • Histograms and Graphical Analysis • Correlation Analysis • Basic Statistics • Sampling • Process Analysis • Failure Mode and Effects Analysis • Gap Analysis • Hypothesis Tests • Summary of Problems • Waste Elimination and Summary of Wastes • 5S • Kaizen 	<ul style="list-style-type: none"> • Recommendations • Improvement Plan • Action Plan • Cost/benefit Analysis • Cost of Poor Quality • Future State Process Map • Design of Experiments • Dashboards • Scoreboards • Weighted Cause and Effect Diagrams 	<ul style="list-style-type: none"> • Hypothesis Testing • Design of Experiments • Basic Statistics • Graphical Analysis • Sampling • Mistake Proofing • FMEA • Control Plan • Process Capability • DPPM / DPMO • Statistical Process Control (SPC) • Standard work • Kaizen • Dashboards • Scoreboards

Figure 4: Summary of Lean Six Sigma DMAIC Most Common Tools

Measurement (metrics):

The measurement component includes defining and applying performance measurements and metrics that can be used to measure improvements in quality, productivity, variability, service delivery, and financials. The metrics measure the Critical to Satisfaction characteristics to show improvement and to ensure that the organization is meeting the customers’ requirements. Use of the Balanced Scorecard (Kaplan and Norton, 1996) can provide a balanced performance measurement system by measuring not only the financials but also the internal processes, the workforce metrics, and the customer growth opportunities metrics.

The Executive Steering Committee should review the status of the projects and meet with the project leaders on a monthly or biweekly basis, using a dashboard that assesses the status of the projects.

Conclusions

This article has described the key components for designing an organization’s Enterprise Lean Six Sigma program. To create an organizational culture that makes fact-based decisions and continually improves processes across the enterprise, the key elements are: value and strategic alignment, enterprise view, culture and change management, teamwork and engagement, infrastructure and methodology, quality and lean tools, measurement and metrics, and customer focus. Many of these elements are already part of an organization that has an advanced quality management system. Even if an organization is not as far along on their quality journey, these elements can be part of the design for the infrastructure of an Enterprise Lean Six Sigma program.

References

Alukal, G. (2003). Create a Lean, mean machine. *Quality Progress*, 36 (4), 29–36.

Brassard, M., & Ritter, D. (2001). *Sailing through Six Sigma: How the power of people can perfect processes and drive down costs*. Marietta, GA: Ritter Resources.

Certified Six Sigma Black Belt Primer. (2001). Quality Council of Indiana

Furterer, S. (2009). Enabling enterprise Six Sigma through business process architecture modeling techniques. *Quality Management Forum*, 35 (3), 7–10.

Furterer, S. (2012). *Systems engineering focus to business architecture: Models, methods and applications*. Boca Raton, FL: CRC Press.

Gitlow, H. S., & Levine, D. M. (2005). *Six Sigma for Green Belts and Champions: Foundations, DMAIC, tools, cases, and certification*. Upper Saddle River, NJ: Pearson/Prentice Hall.

Harry, M. & Schroeder, R. (2000). *Six Sigma: The breakthrough management strategy revolutionizing the world’s top corporations*. New York: Doubleday.

Kaplan, R. S., & Norton, D. P. (1996). *The balanced scorecard: Translating strategy into action*. Boston: HBS Press.

Kotter International. (2011). 8 steps for leading change. Kotter International-Home. Web. 09 Jan. <<http://www.kotterinternational.com/KotterPrinciples/ChangeSteps.aspx>>.

Porter, M. (1985). *Competitive advantage: Creating and sustaining superior performance*. New York: Free Press.

Pyzdek, T. (2003). *The Six Sigma handbook: A complete guide for Green Belts, Black Belts, and managers at all levels*. New York: McGraw-Hill.

Scholtes, Peter R., Brian L. Joiner, and Barbara J. Streibel. *The Team Handbook*. Madison, WI: Oriel, 2003.

2011/2012 Health Care Criteria for Performance Excellence, Baldrige Performance Excellence Program, <http://www.nist.gov/baldrige/index.cfm>

Womack, J. P., & Jones, D. T. (1996). *Lean thinking: Banish waste and create wealth in your corporation*. New York: Simon & Shuster.

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Operationalizing Deming's 14 Points

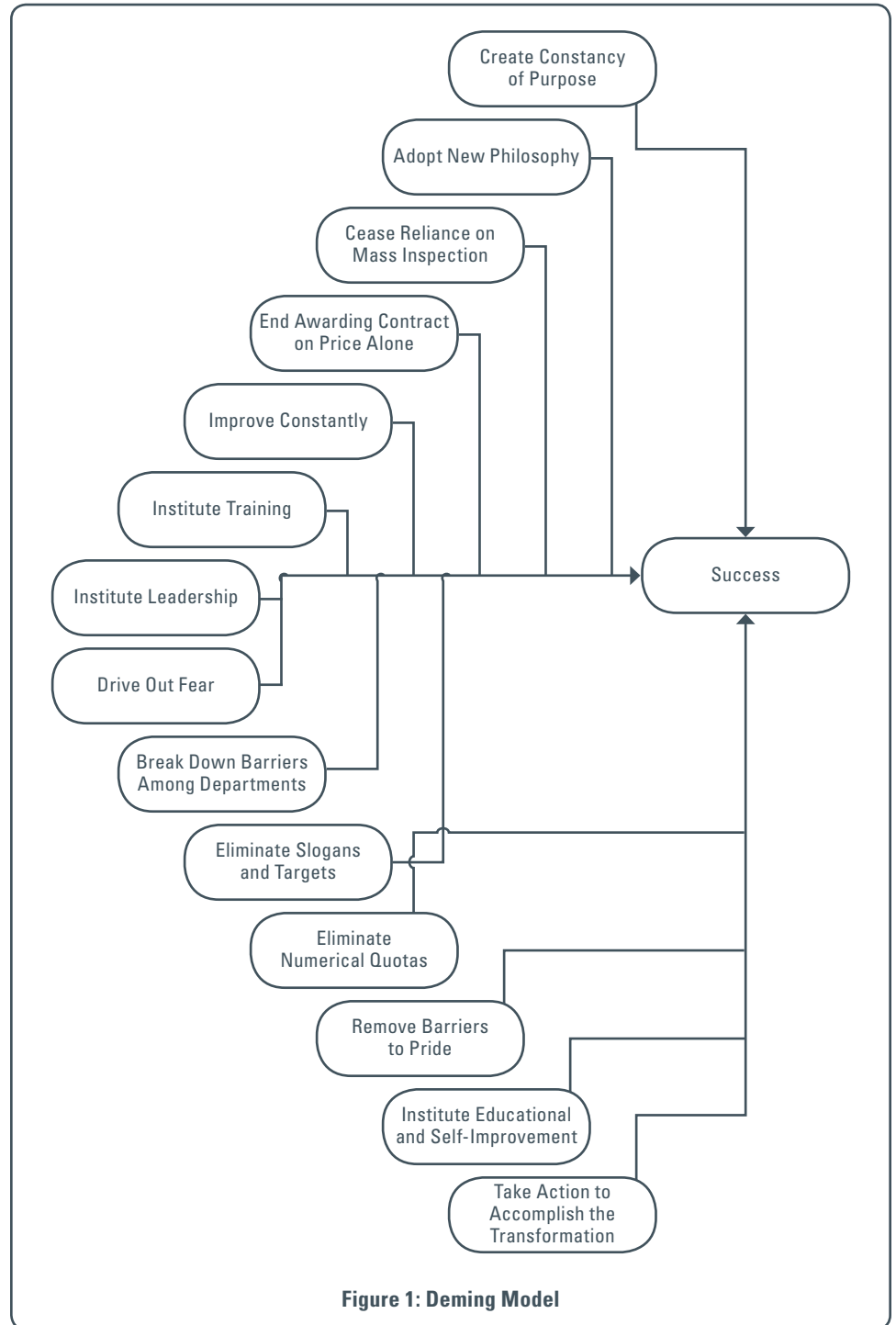
By Cassandra C. Elrod, PhD

W. Edwards Deming was one of the major proponents of quality management, along with Walter Shewhart, Joseph Juran, Philip Crosby, and others. He was among those given credit for the rapid revitalization of the Japanese economy after World War II (Deming, 1986; Walton, 1986; Yoshida, 1989). After his success in Japan, he took his management method to Ford Motor Company (Scherkenbach, 1986b). As Ford's success grew, other companies adopted Deming's approach (Elmuti and Al Diab, 1995; Hodgson, 1987).

In his long career, Deming wrote books and articles about his theory, with *Out of the Crisis* (1986) and *The New Economics for Industry, Government, Education* (1993) being two notable examples. Others have written a number of books about him and his management methods (e.g., Kilian, 1992; Mann, 1989; McCoy & Deming, 1994; Neave, 1990; Scherkenbach, 1986a; Walton, 1986). These sources elucidate Deming's Theory of Profound Knowledge and his 14 Points. Deming's model using his 14 Points is shown graphically in Figure 1.

While a number of case studies have discussed the positive impact of Deming's theory on a variety of organizations, little empirical research exists that actually tests his theory. One important reason is that Deming's theory had not been adequately operationalized (Anderson et al., 1994; Anderson et al., 1995; Tamimi et al., 1995). The concepts underlying his theory had not been turned into operational constructs and no relationships among the concepts had been hypothesized before 1994 (Fisher et al., 2005).

At that time, Tamimi et al. (1995) developed measurement scales for Deming's 14 Points. A more recent study tested the measurement scales developed by Tamimi et al. using an independent data set (Fisher, et. al., 2011). Replication using a unique data set helped establish the validity of the measurement instrument originally developed by Tamimi et al.



The more recent study operationalized definitions (measurement scales) developed by Tamimi et al. (1995) to collect information from a new set of

respondents (Fisher, et. al., 2011). The respondents came from a wide variety of industries, both manufacturing and service, from around the United States

Point 1: Creating constancy of purpose

1. Top management makes our long-term plans.
2. Top management does not provide for research and development.
3. Top management provides for new technology.
4. Top management provides for employee training/education.

Point 2: Adopting the new philosophy

1. Top management is committed to quality improvement as a way to increase profits.
2. Top management is committed to setting objectives for quality improvement.
3. Top management is committed to continuous quality enhancement as a primary goal.

Point 3: Ceasing reliance on mass inspection

1. Suppliers use statistical quality control techniques.
2. Statistical control techniques are used to minimize reliance on mass inspection.
3. Top management supports the belief that quality must be "built into" the product and not "inspected into" it.

Point 4: Ending the practice of awarding business based on price tag alone

1. Supplier selection is based on quality and price rather than price alone.
2. Suppliers are involved in the product/service development process.
3. Long-term relationships are developed with suppliers.
4. There is a reliance on a few dependable suppliers.

Point 5: Improving constantly the system of production or service

1. Customers' requirements are analyzed in the process of developing a product/service.
2. Customers' feedback is used to continually improve the product/service.
3. Top management assesses its competitors in order to improve the product/service.

Point 6: Instituting training

1. Employees are not trained in statistical improvement techniques.
2. Employees are trained in quality related matters.
3. Employees are trained in specific work-related skills.
4. Supervisors are trained in statistical improvement techniques.

Point 7: Instituting leadership

1. Supervisors help their employees on the job.
2. Supervisors work to build the trust of their employees.
3. Supervisors lead in a way that is consistent with the aims of the organization.
4. Supervisors are viewed as coaches by their employees.

Point 8: Driving out fear

1. Employees express new ideas related to improving work conditions.
2. Employees seek their supervisors' assistance when unsure of their tasks.
3. Employees are not afraid to report working conditions that interfere with quality.
4. Employees feel they have no job security.

Point 9: Breaking down barriers among departments

1. Different departments have compatible goals.
2. In the product/service design process there is teamwork among departments.
3. There is good communication among departments.

Point 10: Eliminating slogans and targets.

1. Top management provides its workers with the methods/procedures to meet the goals.
2. Top management, not the hourly workers, is responsible for removing obstacles that cause defects/errors.
3. Top management does not use vague slogans (i.e. "Do It Right the First Time") in communicating with its employees.

Point 11: Eliminating numerical quotas

1. Work standards are based on quality and quantity rather than on quantity alone.
2. Work standards are set based on process capability studies.
3. Numerical quotas are not given higher priority than quality of workmanship.

Point 12: Removing barriers to pride in workmanship

1. Performance appraisals are not used to rank employees.
2. The quality of the working environment is poor.
3. There is inadequate documentation on how to do the job.
4. There is no pressure for short-term results.
5. Top management sets realistic goals for its employees.

Point 13: Instituting education and self-improvement

1. There are programs to develop teamwork among employees.
2. There are programs to develop effective communication among employees.
3. There are programs to develop employees' conflict resolution skills.
4. There are programs to broaden employees' skills for future organizational needs.

Point 14: Taking action to accomplish the transformation

1. Top management takes action toward executing its quality improvement policies.
2. Top management makes its quality improvement policies visible to all employees.
3. Top management relies on internal and external consultants to implement its quality improvement policies.

Figure 2: Tamimi et. al. (1995) Measurement Items

and Canada, that were in varying stages of applying quality management principles to their operations. The thought was that if the study arrived at results similar to those of the Tamimi et al. study, the business community would have substantially greater assurance about the credibility of the critical concepts in the Deming management theory, ways to implement them, and—ultimately—ways to measure them after implementation.

Quality Management and Industry Implications

Industrial firms have a long history of "believing" in quality management principles, but they struggle to implement them in a way that yields

meaningful results. Successful quality management principles can return process improvements, waste reduction, employee empowerment, and increased productivity that can lead to a competitive advantage and increased market share. So why is everyone not rigorously practicing quality management principles? The most evident problem seems to be lack of implementation guidelines to ensure that a firm's quality management efforts are successful (Sebastianelli & Tamimi, 2002; Tamimi & Sebastianelli, 1996). Generally, industry does not have the time or the resources to employ a tactic if they do not have guidelines for implementation and cannot be assured that their efforts will be fruitful. Therefore, developing an

operationalized approach to implementing and measuring quality management is crucial for its success in organizational settings (Westgard, 2000).

Deming's 14 Points are often hard to put into directives, which in turn makes them hard for industry to implement. The 14 Points are generally presented in a manner of a "charge" or a "command," with little guidance as to how industry managers can actually go about using them for obtaining results. Tamimi developed a system to explore whether or not Deming's 14 Points can be operationalized and presented to industry in a manner that can

(OPERATIONALIZING DEMING'S 14 POINTS,
continued from page 9)

be immediately and intuitively applied for results (Tamimi). Such operationalization of the 14 Points will make successful implementation of quality management in organizations easier to accomplish. A further description of this process follows.

The Tamimi et al. Study

According to Tamimi et al. (1995), the success of implementing quality management depends on the ability of managers to interpret and measure Deming's 14 Points. Because Deming's own publications offered little specific guidance on how to interpret, measure, and implement the 14 Points, Tamimi et al. developed a set of operational measures that are based on a synthesis of quality literature by Aguayo, 1990; Deming, 1986; Gabor, 1990; Gitlow, 1990; and Walton, 1986. The 50 non-overlapping items developed by Tamimi et al. are meant not only as operational measurements of Deming's 14 Points, but also as guidelines for industrial implementation (see Figure 2).

Tamimi et al. (1995) tested the validity and reliability of their instrument using a sample of firms that were involved in implementing quality practices over time periods of one to five years. The survey response rate was 46 percent, with the responses split into 105 service divisions and 68 manufacturing divisions.

Recent Study

The original empirical study done by Tamimi et al. (1995) developed a measurement instrument to operationalize Deming's 14 Points and found it to be both reliable and valid. The recent study (Fisher, Elrod, and Mehta, 2011) was intended to determine if the original Tamimi findings could be replicated to either support or reject its findings. Using a different sample, the researchers asked the same questions to determine whether the results could be repeated using a new sample. The findings were remarkably close to those of the original study. This study proved strong evidence (criterion validity) that success on measures is correlated with quality performance as

measured by three items: (1) "Our firm is better than the competition in quality of product conformance," (2) "Our firm often has to repeat work because it was not done correctly the first time," and (3) "Our firm is better than the competition in customer retention rate." The multiple correlation coefficient of the 14 scales found in this study was 0.80, versus the 0.64 found in the Tamimi et al. (1995) study.

The recent study not only generally confirmed the findings of the original study, but also strengthened (using confirmatory factor analysis method) the case that the Deming management method, as defined in his 14 Points, is effective. The researchers also improved upon Tamimi's scales that operationalized Deming's 14 Points into a method that can be employed and measured by industry (Fisher, Elrod, and Mehta, 2011).

In business, even with the most sophisticated and rigorously tested models, there is no promise that application of any particular model ensures success. However, as in sports such as baseball, golf, and tennis, consistent success demands hitting the ball with a consistent, structured swing. Many managers believe that a disciplined and structured swing for consistent business success begins with adequate measurement scales. The measurement instrument described in this paper, based on Deming's 14 Points and developed by Tamimi et al. (1995), is strongly supported by the data as reliable and valid. This measurement instrument is highly recommended to business managers who wish to improve market share, improve efficiencies, and gain a competitive edge through operationalizing Deming's 14 Points of quality management. Industries not only have a guided method of where to start to employ quality management principles, but they also have a method by which to measure the outcomes of their efforts, make improvements in their implementation, and maximize a positive outcome.

References

- Aguayo, R. (1990). *Dr. Deming: The American who taught the Japanese about quality*. New York: Simon and Schuster.
- Anderson, J. C., Rungtusanatham, M., & Schroeder, R. G. (1994). A theory of quality management underlying the Deming management method. *Academy of Management Review*, 19 (3), 472–509.

- Anderson, J. C., Rungtusanatham, M., Schroeder, R. G., & Sarvanan, D. (1995). A path analytic model underlying the Deming management method: Preliminary empirical findings. *Decision Sciences*, 26 (5), 637–658.
- Deming, W. E. (1986). *Out of the crisis*. Cambridge, MA: MIT Center for Advanced Engineering Study.
- Deming, W. E. (1993). *Quality, productivity, and competitive position*. Quality Enhancement Seminars, Inc., 39.
- Elmuti, D., & Albiab, T. F. (1995). Improving quality and organizational effectiveness go hand in hand through Deming's management system. *Journal of Business Strategies*, 12 (1), 86–98.
- Fisher, C. M., Barfield, J., Li, J., & Mehta, R. (2005). Retesting a model of the Deming management method. *Total Quality Management & Business Excellence*, 16 (3), 401–412.
- Fisher, C. M., Elrod, C. C., & Mehta, R. (2011). A replication to validate and improve a measurement instrument for Deming's 14 Points. *International Journal of Quality and Reliability Management*, 28 (3), 328–358.
- Gabor, A. (1990). *The man who discovered quality*. New York: Times Books.
- Gitlow, H. (1990). *Planning for quality, productivity, and competitive position*. Homewood, Ill.: Dow Jones-Irwin.
- Hodgson, A. (1987). Deming's never-ending road to quality. *Personnel Management*, July, 40–44.
- Kilian, C. S. (1992). *The world of W. Edwards Deming* (2nd ed.). Knoxville, TN: SPC Press.
- Mann, N. (1989). *The keys to excellence: The Deming philosophy*. Glos, Scotland: Management Books 2000.
- McCoy, R., & Deming, W.E. (1994). *The best of Deming*. Knoxville, TN: SPC Press.
- Neave, H. R. (1990). *The Deming dimension*. Knoxville, TN: SPC Press.
- Sebastianelli, R., & Tamimi, N. (2002). How product quality dimensions relate to defining quality. *The International Journal of Quality & Reliability Management*, 19 (4), 442–453.
- Scherkenbach, W. W. (1986a). *The Deming route to quality and productivity: Road maps and roadblocks*. Rockville, MD: Mercury Press/Fairchild.
- Scherkenbach, W. W. (1986b). Performance appraisal and quality: Ford's new philosophy. *Quality Progress*, 18 (4), 40–46.
- Tamimi, N. (1995). An empirical investigation of critical TQM factors Using exploratory factor analysis. *International Journal of Production Research*, 33 (11), 3041–3051.
- Tamimi, N., Gershon, M., & Currall, S. C. (1995). Assessing the psychometric properties of Deming's 14 Principles. *Quality Management Journal*, Spring, 38–52.
- Tamimi, N., & Sebastianelli R. (1996). How firms define and measure quality. *Production and Inventory Management Journal*, 37 (3), 34–39.
- Walton, M. (1986). *The Deming management method*. New York: Putnam.
- Westgard, J. O. (2000). Assuring quality through Total Quality Management. *Westgard QC, Inc Essays*, <http://www.westgard.com/essay4/htm>.
- Yoshida, K. (1989). Deming management philosophy: Does it work in the United States as well as in Japan? *Columbia Journal of World Business*, 24 (3), 10–17.

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Blitz QFD®—the Modern, Matrix-Free Way to Profit Improvement

By Glenn Mazur

Background

Profit equals revenue minus cost. There are two ways to improve profits—increase revenue and decrease costs. Traditional quality approaches, such as Lean Sigma, focus on the latter—variability reduction, reliability improvement to decrease warranty costs, and other means by which labor and supplier costs are decreased through improved productivity and supply chain savings. The best you can get, though, is zero costs. The former, increased revenue is earned through the sale of new products. This can result from better marketing efforts, channel efficiencies, and new product quality. The best you can get in revenue increase is limited only by the size of the market, which globally, is growing.

New product quality has long been defined in terms of “fitness” for use, fitness for market, fitness for price, fitness for environment, etc. A design quality perspective focuses on “fitness for use” by customers. This is often called customer-driven product development.

The best practice interface of customers and new product development quality began in the 1960s in Japan when Drs. Mizuno and Akao developed Quality Function Deployment (QFD). The concept was that customer satisfaction (quality) with new products had to begin upstream before design quality was set, specifications determined, and manufacturing processes engaged. In most organizations pre-design was the arena of new business development and marketing, design specifications were the arena of engineering, and manufacturing processes were the arena of manufacturing and production engineering coupled with quality control. Thus, *quality* concerns could not just wait their turn, but needed to be *deployed* across all the appropriate business *functions*.

In the resource-bountiful, lifetime employment world of 1960s Japan, QFD grew into a series of large, complex matrices, such as the House of Quality, to drill down customer needs into sufficient detail for design, development, build, delivery, and service quality. Twenty-first century Lean organizations can rarely support this level of effort, and so project teams have been seeking a more efficient approach. Product developers frequently express that although QFD is a good thing to do, there is no longer enough time or people to complete the process. This has resulted in many teams quitting in the middle or abandoning QFD altogether.

Aware of this problem, Akao asked the author and his colleagues at the QFD Institute (a non-profit research organization in Michigan) to make QFD more efficient for modern Lean organizations. Based on Blitz QFD® for software developed by one of the founders of the QFD Institute, a more generalized approach emerged in 2000 that became the foundation of the QFD Green Belt® and QFD Black Belt® programs, which focus specifically on a progression of QFD skills. The goal was to retain the benefits of QFD but to streamline the process.

How Blitz QFD® Works

The purpose of QFD is to focus designers, developers, builders, and deliverers (whether your business is product, service, process, or software) to assure that the quality of their efforts will create more value for customers than competitors’ offerings. For most projects, it will be a small number of things that will ensure this competitiveness—everything else must be more or less equal. Further, because most modern project teams are so time and resource constrained, they cannot do much more than a few things better than the competition, anyway. From this perspective, then, it is most efficient to focus on the few things that make a competitive difference. Figure 1 illustrates the Blitz QFD® concept that developers’ best efforts should focus on a small number of the most important customer needs and ensure that all downstream functions align their best efforts accordingly in order to deliver value in the final product. Thus, the idea is to do your best where customers will get the biggest bang for their buck. Blitz® QFD’s streamlined focus replaces (or supplements) traditional QFD’s serial matrices of large, comprehensive data sets of customer needs and product characteristics for detailed development, build, and delivery.

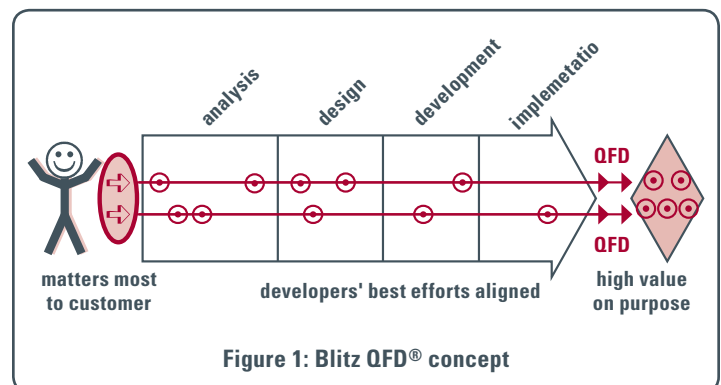


Figure 1: Blitz QFD® concept

(BLITZ QFD®—THE MODERN, MATRIX-FREE WAY TO PROFIT IMPROVEMENT, continued on page 12)

(BLITZ QFD®—THE MODERN, MATRIX-FREE WAY TO PROFIT IMPROVEMENT ,
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The risk, though, is in getting these top few customer needs right. For this, a new voice of customer (VOC) analysis tool set was created to document what is known and discover what is unknown. The generic tool set includes worksheets for:

1. Setting project scope and goals.
2. Defining and prioritizing key customer segments.
3. Acquiring VOC through multiple channels, including a unique-to-QFD approach of going to the customer's *gemba* (the place of work or life where the product is to be used).
4. Translating VOC into product independent customer needs.
5. Having customers organize their needs to reveal hidden, unspoken ones.
6. Having customers prioritize their needs in ratio scale. Ratio scale prioritization helps accurately sort the critical few customer needs from the trivial many.
7. These needs are then deployed into the product development phases appropriate for the organization. At each phase, critical-to-quality characteristics and parameters as well as design solutions and implementation means must be defined, validated, and deployed to the next phase. Since these are confined to the critical few customer needs, the project team is highly focused to expend their energy here. This results in a product that assures better customer satisfaction than competitive alternatives.

For the many trivial customer needs, most projects can offer their standard engineering solutions since improvements in these areas will earn less customer satisfaction than for critical needs. This, of course, assumes that a standard engineering solution exists. For

most projects that are fixes, refreshes, or next generations, this is usually not a problem. For truly new products, it may be more useful to begin with the Blitz QFD® and then follow with the more complex matrices when deeper analysis is necessary.

The Role of Quality Managers in Blitz QFD®

Research by members of the International Council for QFD (www.icqfd.org) has shown that management support is critical for success (Miguel, 2003). Common problems reported by traditional QFD teams include:

- Organizational structure difficulties: 30% of teams reported this problem
- Lack of management support: 40%
- Team member commitment: 50%
- Lack of human/financial resources: 35%
- Lack of QFD experience: 50%
- No time to get customer needs: 30%
- Difficulty rating customer needs: 35%

To address these, Blitz QFD® begins with custom tailoring the QFD process to improve adoption and compliance by the marketing and engineering groups. Tailoring diagnoses the new product development process, the industry and technology, the customers and competitors, and related factors. Based on this, a tailored QFD process and tools are recommended for both minimum effort and advanced projects. Management deliverables and responsibilities are also noted, particularly for gate reviews.

Conclusion

Blitz QFD® is a powerful way to achieve profit through increased revenue from new products that satisfy customers better than competitive products and reduced development costs from focusing resources on a small number of critical customer needs. This is best accomplished when quality managers employ a QFD process that is appropriate for their organization and request evidence from that process at each gate review. Case studies of custom tailored QFD applications in a variety of industries can be downloaded at www.mazur.net. Blitz QFD® information can be found at the QFD Institute website at www.qfdi.org

References

Miguel, PAC. (2003). The State of the art of the Brazilian QFD applications at the top 500 companies. *Special Issue of the International Journal of Quality and Reliability Management: The leading Edge in QFD.*

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TASER's Roadmap to Quality

By *Connie M. Borrer, PhD, Tom Beechey, Dan Shunk, PhD, Mike Gish, Douglas Montgomery, PhD*

Mission and Challenges

TASER International, Inc. has a long history of providing products that have saved countless lives. During the last decade, TASER has experienced a market growth that led to a larger customer base, not only across the United States but worldwide. As a result, TASER's products have been used in new environments and under operating conditions never before experienced. Unfortunately, with new uses, new products, and new customers, quality suffered. New product launches, such as the X3 in 2009, resulted in immediate quality issues with customer out-of-the-box experiences. Problems such as missing manuals, missing components, devices not firing, or lasers not functioning made their way to the customer.

As TASER matured, they experienced many challenges such as these enterprise-wide. At one time, their supply chain was low-performing, with 63% of its suppliers rated as high-risk. This resulted in significant interruptions in delivery, overstock of inventory, and material that was marginally acceptable. Some suppliers were the sole provider of certain parts and material. As a result, TASER had to increase the number and type of inspections done on incoming material, and if problems were detected, a decision had to be made whether to send the supply back or to use the supply and adjust design and production accordingly; either decision resulted in significant delays. Marginally acceptable parts or material received would often require a change in product design and manufacturing to meet quality expectations.

In research and development, an iterative design process (IDP) was used to design and build a product. IDP involved a "design, build, repair, rebuild" approach to product development. Although this

sounds reasonable, it is a costly process that involves building and manufacturing a product, shipping to customers, and—as new problems or failures occur in the field—re-designing the product to fix the problems. The product is then put into production and the process begins all over again. This is similar to testing one feature at a time, seeing if the product works with this new feature, putting it into production, and shipping. Features could be added, removed, or changed at any time. With this process, it can take several years to fully characterize a product, during which time customers experience what they perceive as poor quality. In addition, voice of the customer was not captured up front to determine if new features were really wanted or needed. This type of approach to product development is not uncommon in companies that experience early product successes and then expansive growth. New product development was dictated by schedules and promised dates of new product launches. However, this reactionary approach to problem solving only creates more problems and poor quality as a company's customer base and end-use conditions expand.

Throughout the company, TASER divisions often worked in "silos." Sales, IT, R&D, and manufacturing, for example, worked independently to a great degree, not really knowing what the other divisions were doing until very late in the development, production, or manufacturing process. R&D and manufacturing would work together once the new or redesigned product was ready for full production. This would sometimes result in production delays because manufacturing had to be configured (or reconfigured) to meet new design requirements. In addition, the sales team would not be familiar with product development early in the

design process. As a result, sales would often have a very short window in which to learn about the new product in order to promote it to customers or potential customers. Customer service would be notified of product defects (missing manuals, missing parts) through returns by or complaints from the customer, but this information did not always flow over to other divisions, such as manufacturing.

A New Era of Quality

The challenges experienced by TASER in these and other areas led to opportunities for improvement. Company leadership understood that to remain the industry leader, a complete culture change had to occur and a new level of thinking about quality had to be put into action. New people were brought in and employees moved into new positions to assist in a much-needed culture change. Additionally, in 2009 TASER partnered with Arizona State University (ASU) to move TASER to the next level of operational excellence (OpEx).

Lean Training

One of the first steps towards operational excellence involved education and training. Twenty-five TASER employees went through Lean training delivered by ASU faculty and were given the task of identifying Lean projects within TASER. Results of the projects were remarkable. In manufacturing, for example, problems identified included production being hampered by unnecessarily complex process steps, missing or broken hand tools, and lack of work instructions. In response, standardized tools were adopted, processes were moved to single piece flow where possible, and written and pictorial work instructions were posted at every work station. TASER

(TASER’s ROADMAP TO QUALITY,
continued from page 13)

experienced approximately \$1M in savings in the first year alone and expects nearly \$1.5M in savings in the second year because of these and other projects.

VSAT Survey Results and Implementation

While TASER team members were identifying and implementing Lean projects, Drs. Dan Shunk and Douglas Montgomery of Arizona State University conducted a company-wide survey using the value-based strategic assessment tool (VSAT). The VSAT identifies gaps between the desired state and the current state of a particular goal within the organization—a goal such as operational excellence. The survey included questions in five Malcom Baldrige categories: leadership, strategic planning, customer and market focus, human resource focus, and process management. For example, focus groups surveyed thought that the biggest gap in achieving OpEx at TASER was that quality was not engrained in the TASER culture.

The VSAT survey was developed to capture three components:

- **C:** Current State of a condition (ex: quality at TASER) (rated 1–5)
- **D:** Desired State of a condition (rated 1–5)

- **V:** Value if gap filled (value or importance of this condition to the company if we can get it) (rated 1–5)

The gap value is then calculated as $(D - C) * V$, where larger values indicate a significant gap between “what is” and “what should be.”

A value gap was calculated for each question relating to the above criteria. The objective was to determine what leaders and focus groups felt were important, but that were keeping TASER from achieving overall Operational Excellence (OpEx). For example, survey results indicated that the #1 gap for the focus group was, “Quality is engrained in TASER values,” with a large gap score of 13.46. This gap score was calculated as follows: on a scale of 1–5, the focus group indicated that quality being engrained in TASER is a highly desirable attribute with a “desired” score of $D = 4.92$. The focus group felt that quality was not engrained in TASER, resulting in a “current” attribute score of $C = 2.23$. In addition, quality at TASER is highly valued and given a score of $V = 5$. The gap score for “Quality is engrained in TASER values” is then

$$\begin{aligned} \text{Gap} &= (\text{Desired} - \text{Current}) * \text{Value} \\ &= (4.92 - 2.23) * 5 \\ &= 13.46 \end{aligned}$$

So what does this mean? The focus group surveyed by the ASU team thought the biggest gap to achieving OpEx at TASER was that quality was not engrained in the TASER culture. The top 12 gaps based on the VSAT results for both leadership and the focus group appear in Table 1. The results indicate a significant amount of agreement between the focus group and leadership and are typical for a technology company that must now blend innovation with operational excellence. In summary, the VSAT results indicated:

- TASER leadership was historically driven by innovation and sales/marketing focus on new products.
- TASER needed to extend innovation into world-class processes.
- TASER Continual Quality (TCQ) was not known by all within the company.
- Formal customer requirements were not being documented on legacy products.
- Quality/reliability were not prominent in the TASER culture.
- NPI processes existed, but were not followed.
- There was a need to accelerate TASER transition from quality control to quality engineering focus

Table 1: VSAT Results (Gap scores given in bold)

Importance	Leadership Top 12 Gaps	Focus Group Top 12 Gaps
1	12.47—Processes in place to acquire new customers	13.46—Quality is engrained in TASER values
2	11.86—TCQ is known by all	13.21—Leadership values quality equal to new product intro
3	11.68—Leadership values quality equal to new product intro	12.26—Robust design for Six Sigma employed
4	11.56—Customer requirements documented	11.93—TCQ is known by all
5	11.41—Quality is engrained in values	11.74—All critical suppliers characterized
6	11.16—A CMMI level has been established	11.46—A CMMI level has been established
7	11.16—Product development innovations developed to meet customer expectations	11.46—Product development innovations developed to meet customer expectations
8	10.63—“Six Sigma-like” philosophy present	11.37—Leadership values quality equal to sales revenue
9	10.41—Open communication	10.88—Customer requirements documented
10	10.09—Senior leaders personally promote	10.83—Learning and development addresses core processes
11	9.85—Leadership values quality equal to sales revenue	10.83—Processes in place to acquire new customers
12	9.80—CTQ parameters are clearly defined	10.81—Senior leaders personally promote

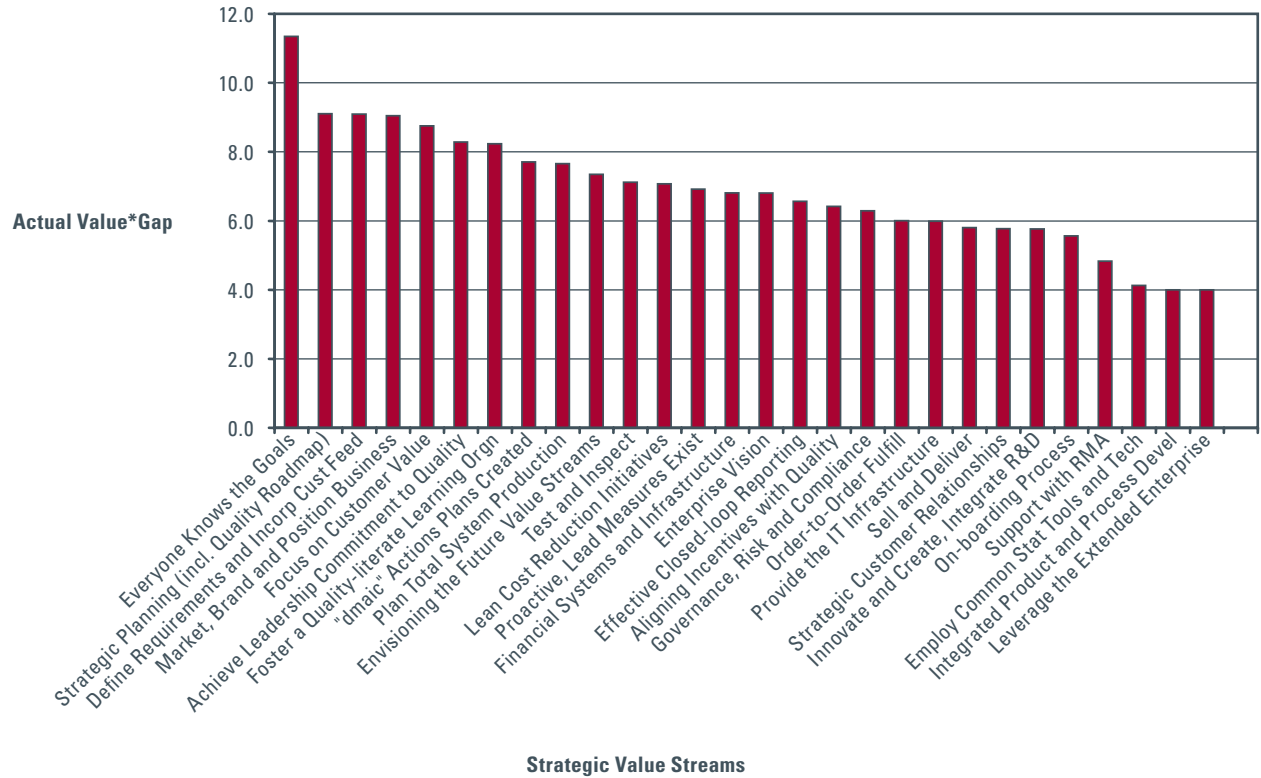


Figure 1: VSAT Results from Executive Team Leaders Quality Workshop

Quality Leadership Workshop

Results of the VSAT survey were discussed with the entire TASER executive leadership team at a one-day workshop in 2010. The team was asked to complete its own VSAT on quality at TASER from the executive perspective. The results of the executive team VSAT are displayed in Figure 1. The executive VSAT identified some top priority opportunity goals:

1. Create a formal customer feedback improvement plan.
2. Foster a quality-literate organization.
3. Develop a quality roadmap for enterprise new product development (NPD) including DMAIC, quality project selection, and organizational value stream mapping.

By the end of the workshop, a roadmap to Operational Excellence was recommended. The recommendations included: (1) a management action plan; (2) continued

education and training; and (3) a gated process to new product development.

Today, TASER has made significant gains in quality improvement in all areas and all divisions and continues on a path of operational excellence. With continual implementation of Lean and quality methods and tools, as well as following the recommendations resulting from the workshop, TASER has successfully addressed many of the challenges and quality issues of the past. Some of the recent successes are discussed in the next section.

Recent Successes

TASER has implemented numerous changes over the last two years that will result in more successful product launches. The true measure of success will be the customers' experiences with new products. Some of the initiatives that TASER has undertaken and implemented successfully are:

- **Quality awareness training** for all employees in the company. These half-day workshops were held over 11 days for every TASER employee from the manufacturing line up to management. The goal of the training was to make employees aware that quality is everyone's job.
- **Continued education and training.** A five-day probability and statistics course was attended by 24 TASER engineers and technicians. This training provides the basis for all future training in quality and improvement.
- **A Stage (Phase)-Gate process** for new product development. The stage-gate process has allowed TASER R&D to concentrate their efforts on only the most important features of new products. Gates are in place to make sure every key TASER employee is on board before moving to the next stage. Feature freeze and

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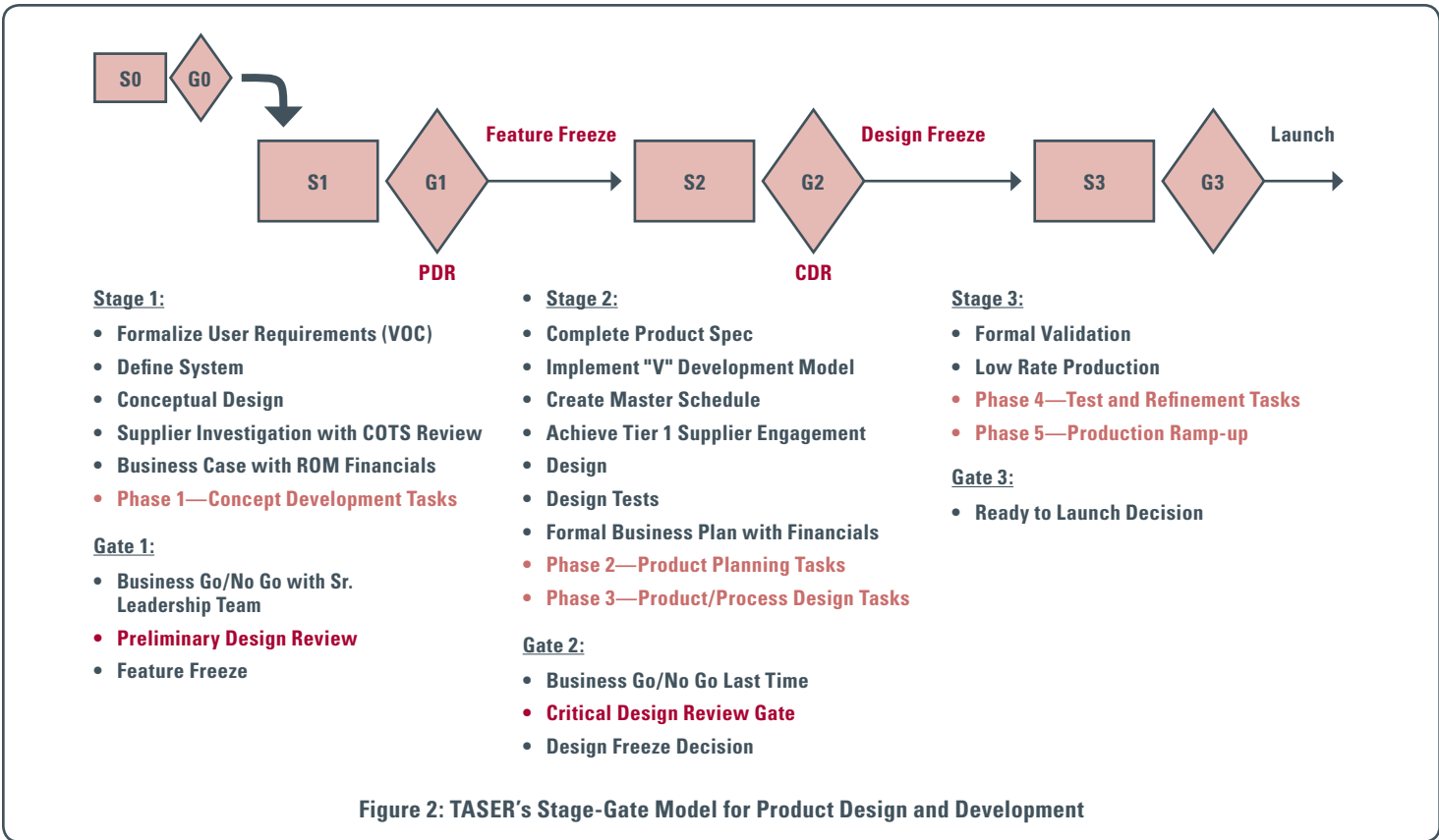


Figure 2: TASER's Stage-Gate Model for Product Design and Development

Table 2: Customer Survey Results of Important Considerations in an ECD Purchase		
What attributes are most important to you when considering your next ECD Purchase?	Total	Percent
Price	270	67%
Ability to fire a second cartridge to deal with a missed shot or poor contact	242	60%
Overall size of the ECD	232	57%
Ability to engage multiple suspects with a single ECD	126	31%
Overall weight of the ECD	119	29%
Ability to display a warning arc without having to unload cartridges	96	24%
Size of grip	96	24%

Table 3: Customer Survey Results for Important ECD Features		
What is most important in an ECD?	Total	Percent
Effective	300	99%
Price	205	55%
Battery life	198	54%
Simple user interface (easy to use/operate)	195	53%
Overall size of the ECD	130	35%
Flashlight integrated into the ECD	88	24%
A video camera that can be attached to your ECD	80	22%
Dual laser sights	79	21%
Overall weight of the ECD	60	16%
Size of grip	30	8%
Graphical user display	22	6%

design freeze are held firm—to allow R&D to work only on those features and designs that are viable. See Figure 2 for the stage-gate process implemented by TASER.

- **Voice of the customer.** Over the last 18 months, TASER has included VOC like never before. If a feature is not seen as important by the customer, it is not included in the new product—no matter who in the company thinks it should be. See Tables 2 and 3 and Figure 3 for how VOC influenced new product development.
- **Continual improvement circles.** Driven bottom up, these teams are responsible for driving improvements within their areas or within their control. The system is simple. An idea can start from anyone within the company and be submitted on a “TASER Continual Improvement” form. Upon submittal, all ideas are reviewed through the Change

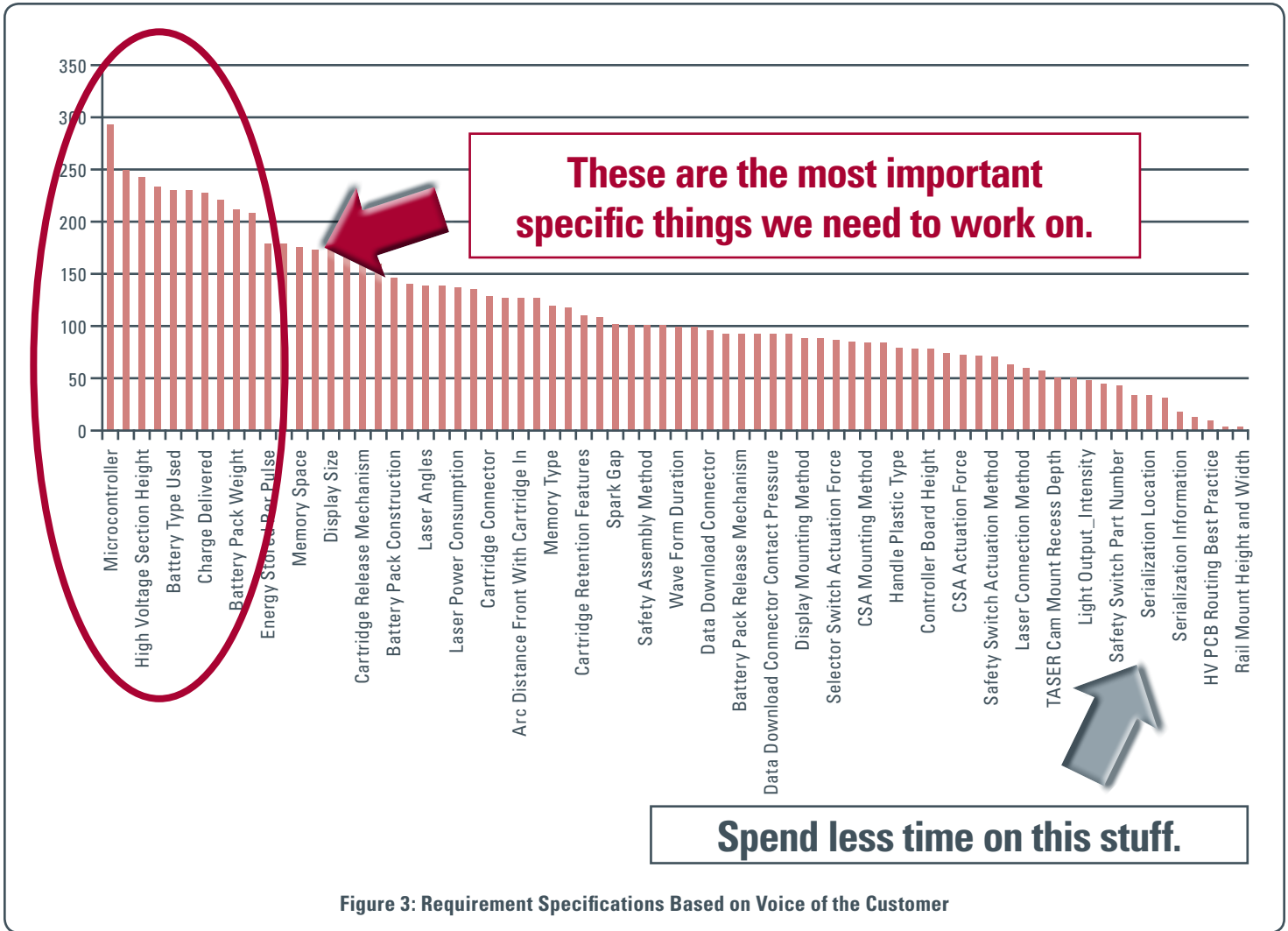


Figure 3: Requirement Specifications Based on Voice of the Customer

Control Board process and evaluated for further implementation. If the board decides that the idea has purpose, merit, and/or value, it then becomes actionable through a continuous improvement circle. The circle, or team, then goes through a process to address all actions that need to be taken, processes that need development, and any financial considerations. These teams incorporate elements from the traditional quality circles, kaizen events, and Lean practices as the fundamental building blocks.

Currently, TASER is looking forward to developing value stream maps (VSM) for the entire organization since the mapping will certainly help drive many valuable improvement circles to further optimize and align their organizational structure.

New Product Results

As a result of the new quality management and training initiatives that have taken hold in TASER, new product failures have been almost nonexistent. Product testing has resulted in some failures, but those have been mapped back to material, manufacture, or design problems that have been eliminated. Here are some of the key focus areas for our validation tests on a new electronic control device (ECD):

- LASER testing
- Flashlight testing
- High voltage coil testing
- Cartridge connector testing
- Trigger switch cycle testing
- Life cycle testing
- Drop testing

While a full product validation is performed to ensure all results meet or exceed design specifications and environmental criteria, each test element is carried out under the strict control of an approved test protocol and defined sample size. Final results are documented, and any noted failures receive full root cause analysis to characterize and correct the issues.

ISO and Auditing

TASER was initially certified to ISO9001:2000 in March, 2006. At that point, all internal audit activity was outsourced to a local auditing company. Additionally, quarterly surveillance was in place and conducted by the company’s registrar. With the renewed focus on quality management initiatives, TASER has begun doing their own internal audits, and

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(TASER's ROADMAP TO QUALITY,
continued from page 17)

the entire company became accountable for any and all improvements. As a result, TASER has created an exceptional track record with quarterly surveillance audits. Based on those results, a petition was submitted with the registrar to reduce the quarterly audits to an annual surveillance. TASER is now certified ISO9001:2008 and entering its third year of annual surveillance auditing. Their most recent audit, held in early April 2011, produced only two opportunities for improvement, with no major or minor findings.

The Future of Quality at TASER

Quality excellence is being instilled successfully throughout TASER. The focus is on business processes and making people more productive. In addition, guard bands are in place system-wide to protect against making bad product. At the Quality Leadership Workshop, attendees were provided with the seven facets of TASER's roadmap to quality:

1. Get TASER leadership aligned and link quality to the strategy of TASER.
2. Formalize Customer/Market Feedback.
3. Develop clear communication of company goals to all employees.
4. Establish a rigorous stage-gate process to design-in quality.
5. Effectively manage all changes in streamlined, lean processes.
6. Foster a quality literate organization.
7. Characterize the suppliers.

TASER has demonstrated successful progress on each of these fronts. Most importantly, the culture shift that has taken place enterprise-wide at TASER has been nothing short of astounding. As long as employees feel empowered, supported, and encouraged to make suggestions and to say "no," TASER will continue to reach new heights in quality and operational excellence. The key to continued improvement will be management's support of quality initiatives, education and training, and listening to the voice of the customer.

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QMF Book Summary

Measurement Matters: How Effective Assessment Drives Business and Safety Performance

By Russ Westcott

The authors, Brooks Carder and Patrick Ragan, have published an understandable, sound, and often entertaining overview of the processes of measuring performance. Drawing extensively on the teachings of Dr. W. Edwards Deming, they explore and build on the proven knowledge of variation, reliability and validity, and the application of these principles to designing and using measurements that matter.

Many of the examples in the book are from the safety management arena. This allows the reader to see the similarities from other fields and to examine the value of the principles and practices addressed beyond safety—financial, production, quality, and even in our personal lives.

Readers are challenged to ask themselves: Do you know what is being measured and why? Is what is measured and the method used the best for the circumstances? What are the ramifications of the measures taken and the processes used—the consequences, now and in the future? Does the measurement lead toward improving the processes and outcomes, or does it inhibit? Are we primarily measuring what people do or are we measuring what a process is achieving (recall the Deming observation that 85% of problems stem from system/processes and are therefore a management responsibility that can't be resolved by the performers)?

There is an extensive explanation of the science of measurement, in easy to comprehend language. Reliability and

validity are explored in sufficient detail, with clear examples. The principles are applied for incident investigation, the process of auditing, and surveys. Methods and tools applicable to the area of measurement are defined and demonstrated with ample figures, tables, and charts. Most of the commonly used tools and techniques used in the quality field appear.

In discussing auditing, these questions are suggested:

- Whom is the audit for? Who is the customer?
- What is the audit objective?
- What standards of reliability and validity will be applied?
- Is the design and conduct of a reliable and valid audit worth the resources required?

Readers involved in auditing or in interpreting and reacting to audit findings will find the chapter on audits quite illuminating. Yes, there is commentary regarding how audit findings can be manipulated to portray a more favorable condition, for example the Enron fiasco.

Written by an experimental psychologist with extensive consulting and management experience and a trained safety engineer, the book, in its modest 221 pages, conveys a treasure chest of valuable insights and useful suggestions for the quality professional. Although, the knowledge expounded is not time-bound, the book, published in 2005 by Quality Press, is on the publisher's list of discontinued titles. Considering

the dearth of understanding of the field of measurement by many quality practitioners and top management, it is a shame that this book is not a sought-after item. Could the word "safety" in the title be a deterrent?

The topics explored by the authors include:

1. Principles of Dr. Deming
2. System of Profound Knowledge
3. Principles of Measurement
4. Incident-based Measures
5. Incident Investigation
6. Systematic Observation of Behavior
7. Audits
8. The Safety Survey
9. Taking Action Based on the Survey
10. Leadership

Buy, beg, or borrow this book. It could still be available through ASQ as item H1221.

President of R.T. Westcott & Associates, Russ Westcott is an ASQ Fellow, CQA, and CMQ/OE. He is editor of the ASQ Certified Manager of Quality/Organizational Excellence Handbook, 3rd edition, and a co-editor of the ASQ Quality Improvement Handbook. Russ instructs the ASQ Certified Management of Quality/Organizational Excellence refresher course nationwide. He writes for Quality Progress, Quality Management Forum, the Auditor, and other publications. Russ can be reached at russwest@snet.net. His mailing address is 263 Main Street, Suite 100, Old Saybrook, CT 06475-2326.

Quality Management Journal Preview

QMJ vol. 18, no. 3 Executive Briefs

As a continuing feature of the QMF, we are showcasing the most recent articles in our sister publication, the *Quality Management Journal* (QMJ). The QMF focuses on the practical application of quality principles, and the QMJ focuses on the research aspect of quality. We hope that you will visit their website and begin the synthesis process of merging theory with application to advance the field of quality. <http://www.asq.org/pub/qmj/index.html>

The QMJ provides relevant knowledge about quality management practice that is grounded in rigorous research. They seek:

- Empirical articles that provide objective evidence concerning actual quality management practice and its effectiveness.
- Research case studies that consider either a single application or a small number of cases.
- Management theory articles that present significant new insight and demonstrated practice.
- Review articles that create links to the existing academic literature and aid in the development of an identifiable quality management academic literature.

Here is a summary of their most recent articles.

Antecedents of Project Success: The Perception of Vendor Employees

Gertrude P. Pannirselvam, Southern Illinois University, and Ramana Madupalli, Southern Illinois University

In recent years, the global outsourcing market has been one of the fastest-growing market segments of information technology (IT) services. Both clients and vendors use project management methods to transfer and receive control of information systems functions. This project focus has resulted in an increase in the number of IT projects. And while the success rate of these types of IT projects has improved, it still remains quite low.

Most of the studies concerning the success of IT projects are from the client perspective, and very few report on the vendor's perspective. This study specifically focuses on the determinants of project success from the perspective of the vendor contractor who works on site alongside the client employees and under the supervision of the client managers.

Specifically, it considers the effects of relationship quality, contractor's performance, organizational culture, and process management practices on project success.

In this study the authors hypothesize that organizational culture and process management are antecedents to relationship quality and contractor performance. They collected and analyzed data to test their hypotheses. The survey results indicate that the quality of the relationship between the client and vendor company has a significant impact on project outcomes. Organizations need to take a more strategic view toward process management improvement efforts, and project managers need to focus on promoting formal processes, quality communication, and trustworthy behavior toward vendor employees.

Customized Compliance: Exploring Patterns of Quality Practice Adoption in a Multidivisional Context

Matthew W. Ford, Northern Kentucky University

The scope of quality management is broad, and multidivisional firms wishing to implement it may face some challenges. The expansive scope of quality management suggests that the choice of quality practices among organizations will vary, and this may also be true within multidivisional organizations. The behavior of divisional units can be swayed by a number of factors, including mandates from headquarters. However, at times division managers may behave in a manner that aligns with their own beliefs rather than those of the parent, resulting in a system of "customized compliance."

Understanding the degree to which the adoption of quality practices differs among units of multidivisional organizations and factors that encourage those differences is important. This study aims to better understand the nature of quality practices that multidivisional units adopt under a general stimulus from the parent to do so, and the factors that motivate the differences in adoption patterns across units.

The author developed two hypotheses and collected data from eight divisions of a large forest products company in the United States. These data indicated that units with ceremonial adoption orientations (those that place little faith in quality

management and its benefits) preferred to implement quality management practices likely to build infrastructure and context over practices likely to alter core technical processes. Enthusiast units (true believers in quality management and its benefits) showed no bias between infrastructure and core quality practices. It was also determined that policies that encourage constructive attitudes about quality management and trustworthy information exchange between unit and parent may lower institutional barriers to effective quality practice adoption in multidivisional environments. Divisions are more likely to adopt a balanced set of quality management practices if unit managers possess a sense of quality's intrinsic value.

Knowledge Overlapping Seminars: Conversational Arenas Supporting Joint Directed Action in Projects

Christina Mauléon, Göteborg University, and Peter Cronemyr, Linköping University

Complex projects are often made more complex because of a lack of clarity regarding values and communication among different occupational groups or knowledge domains. Thus, there is a need for strategies for facilitating the co-construction of shared understanding in projects. In response to this need, the authors conducted this study to describe and evaluate a conversational arena that is designed to create a shared understanding in a project with the aim of supporting joint directed action, that is, where separate and collaborative actions are continuously aligned with a common objective. This approach is known as the "Knowledge Overlapping Seminar" (KOS).

The KOS is designed to support the process of co-constructing shared understanding in projects with the aim of delimiting misunderstandings and creating knowledge overlap between people coming together from different organizational contexts. In a KOS, members of a project team have an opportunity to guide one another in their respective different domains of knowledge related and connected to the common project goal. The design of the KOS aims to avoid conversational obstacles to effective knowledge overlap between members from different organizational contexts and from different knowledge domains.

The authors conducted a case study to test the effectiveness of the KOS. Data were collected from questionnaires, interviews, and observations. The KOS was evaluated as a conversational tool for supporting the co-construction process of shared

understanding and as a conversational arena where creative dialogue is supported. The authors concluded that KOS can be a successful tool for these purposes.

Consumer Perceptions of Product Quality Revisited: Made in China

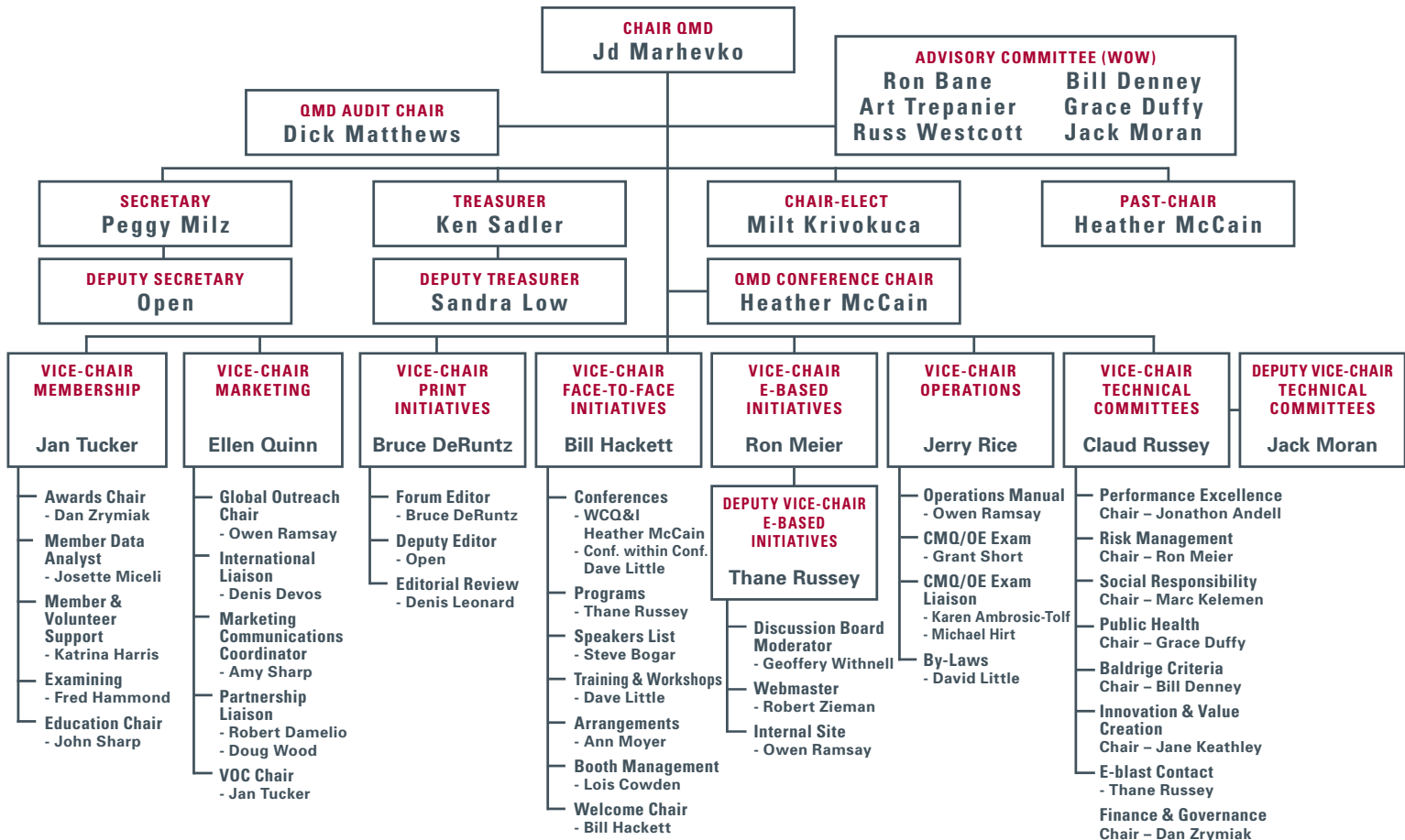
*Marc J. Schniederjans, University of Nebraska-Lincoln;
Qing Cao, Texas Tech University;
Dara Schniederjans, Texas Tech University;
and Vicky Ching Gu, Texas Tech University*

As a follow up to a previous study, this article examines the current state of product quality improvement in Chinese manufactured goods as perceived by U.S. consumers. The earlier study revealed that China had quality management problems; the materials used in Chinese-manufactured goods were of poor quality, leading to a lower consumer valuation of Chinese-made goods when compared with products manufactured by other countries. Since 2004, the time of the previous study, considerable research and advances in quality management have been reported in the literature, and the number of journal articles written on quality management topics in China has increased.

Based on these events, the authors were interested to know whether this increased interest in quality management is an indication that improvements in product quality are actually taking place in China. And, if improvements are in fact taking place, how have they impacted the perceptions of U.S. consumers toward products made in China since 2004?

The study used the same metrics as used in the 2004 study. These metrics are based on product price, durability, survey methodology, purchasing behavior, and consumer perception. The authors used a phone survey to collect data from the consumer subjects in this study. The target audience was a sample of U.S. consumers. The focus centered on their opinions of consumer product quality of Chinese-made consumer products.

One major conclusion of the study is that, despite the considerable quality management research going on in China, potential impacts of those improvements have yet to be seen or perceived by U.S. consumers. There is a continued, substantial, and consistent need for Chinese manufacturers to focus additional efforts toward improving product quality in almost all product lines.



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Coach's Corner

By JR McGee

This month we have another great question:

JR,

How does a leader gauge the value and need for non-monetary “morale”-boosting projects such as a night out or funding a softball team? On the one hand, they feel superficial and the ROI seems difficult to calculate. On the other hand, it seems to be a poor reflection on management when these things are ignored.

*Thomas Czerniecki,
City Manager*

This is an excellent question and one that good leaders are always struggling to solve. I know I'm in the presence of a very poor leader when I hear words to the effect of, “A paycheck should be plenty of reward!” Since money is a simply a “hygiene” factor and not a “satisfier,” how do I prioritize my efforts to get the best ROI / bang for the buck?

First and foremost, as a good leader and manager, you need to thoroughly understand your team. What do they think is important? What do they respond to and value the most? I've been surprised several times during my career to learn that money does not rank at the top of most people's list (even though that is most often what you hear). In a couple of studies that I've done with my own teams, I was very surprised to learn that money didn't even make the top five!

So what was the top motivator? Recognition and the feeling of “belonging” to an “elite” group! And their desire for recognition comes in many different forms. This is why you need to do your homework and find out what matters to your team. Specifically to your question, Thomas, it can often be associating with other team members in

an after-hours event. Be aware however, that not everyone is outgoing and gregarious. Some value their off-time with family and friends the most and would see this type of activity as both intrusive and a burden. Your biggest difficulty is in realizing that there is not going to be a “one-size-fits-all” answer to team building. Indeed, forcing people into something they don't want to do can be counter-productive! Be prepared to support several different team-building activities during the year.

You can conduct your research formally through surveys and team meetings and informally through one-on-one discussions and talks with informal leaders of the group. I find that I get the best results when I use both methods together. Dig deep...don't take answers to these questions at face value. I also find that one of the key principles of team building is often misunderstood. It is not enough to simply “get them together.” I have found that putting them into a situation that forces them to solve or accomplish a challenge that NONE of them can overcome on their own creates a sense of “shared adversity” that is critical to creating a strong bond among people that is difficult to break. When people do something others thought could not be done, there is a shared feeling of accomplishment that builds trust and develops meaningful relationships that carry through into their daily work routines, often lasting for years.

Now comes the tough part—determining the most cost-effective way to achieve your objective. It is relatively simple to conduct a cost-benefit analysis...until you begin to look at the intangibles in your question. What is the dollar value of a strong bond of trust in your workers?

How much is it worth to create shared commitment within your team? This is why it is so important to not waste your efforts on the shallow “feel good” things that your people don't value. We can always find money in our budgets if we look hard enough. As leaders, our job is to prioritize and manage scarce resources. Find efficiencies in your operations somewhere and use the money saved to strengthen your team. A failure to invest in your organization in this way will prevent your team members from achieving their full potential. To measure the effectiveness of your team-building efforts, a very simple survey using a few open-ended questions administered before and after, can reveal a great deal about what is working and what can be improved. You can then compare productivity, morale, and job satisfaction before and after your sessions to determine if there is a direct correlation to performance improvement.

This is a worthwhile investment in your team and your organization! Is it winning a championship softball trophy, donating to a local charity with a record-breaking dollar amount, or is it participating in a community event for a deserving family? Only you and your team can come up with the best answer to this question. But it is one that great leaders take the time to figure out!

Please send your questions for JR to AskCoachJR@x-slg.com.

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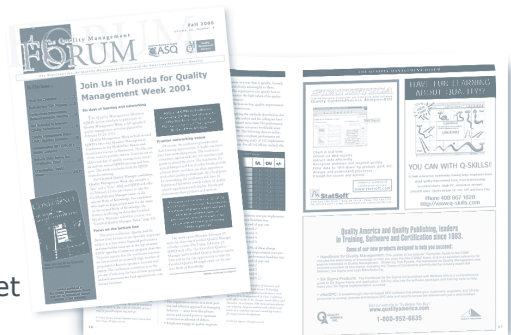


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