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WHAT IS SIX SIGMA?

Daniel L. Quinn

At the end of the day, Six Sigma is much less of a technical program, although it has a lot of technical tools, than it is a leadership and cultural change program.[1]

> Interview with Dave Cote, President and CEO, Honeywell International

We are doing Six Sigma as part of our process improvement initiative. I see Six Sigma, indeed, as the natural next step in how we get process improvement done. Six Sigma is a more high-powered set of tools than our previous methods, plus its basic philosophy forces people like myself, the leaders of the business, to think beyond our existing management techniques and perhaps our existing management philosophy.[2]

> Interview with Stephen J. Senkowski, President and CEO,
> Armstrong Building Products

Six Sigma is a management framework that, in the past 15 years, has evolved from a focus on process improvement using statistical tools to a comprehensive framework for managing a business. The results that world-class companies such as General Electric, Johnson & Johnson, Honeywell, Motorola, and many others have accomplished speak for themselves. Six Sigma has become a synonym for improving quality, reducing cost, improving customer loyalty, and achieving bottom-line results.

HISTORICAL PERSPECTIVE ON SIX SIGMA

We quickly learned if we could control variation, we could get all the parts and processes to work and get to an end result of 3.4 defects per

million opportunities, or a Six Sigma level. Our people coined the term and it stuck. It was shorthand for people to understand that if you can control the variation, you can achieve remarkable results.[3]

Interview with Robert W. Galvin, Chairman Emeritus of Motorola, Inc.

In the mid-1980s, Motorola, under the leadership of Robert W. Galvin, was the initial developer of Six Sigma. Most credit the late Bill Smith for inventing Six Sigma; Smith, a senior engineer and scientist within Motorola's Communications Division, had noted that its final product tests had not predicted the high level of system failure rates Motorola was experiencing. He suggested that the increasing level of complexity of the system and the resulting high number of opportunities for failure could be possible causes for this. He came to the conclusion that Motorola needed to require a higher level of internal quality, and he brought this idea to then-CEO Bob Galvin's attention, persuading him that Six Sigma should be set as a quality goal. This high goal for quality was new, as was Smith's way of viewing reliability of a whole process (as measured by mean time to failure) and quality (as measured by process variability and defect rates).

Motorola had always been a pioneer in the areas of productivity and quality. In the 1980s, Motorola had been the site for presentations of quality and productivity improvement programs by a number of experts, including Joseph M. Juran, Dorian Shainin (our colleague at Rath & Strong), Genichi Taguchi, and Eliyahu Goldratt. Mikel Harry, now president of the Six Sigma Academy and coauthor of *Six Sigma: The Breakthrough Management Strategy Revolutionizing the World's Top Corporations,* was an attendee of some of these programs; inspired in part by their thinking, he developed a program for the Government Electronics Division of Motorola that included Juran's quality journey, Statistical Process Control (SPC), and Shainin's advanced diagnostic tools (ADT) and planned experimentation (PE).

Harry then worked with Smith on the Six Sigma initiative. Harry led Motorola's Six Sigma Institute and later formed his own firm specializing in the subject. Smith and Harry's initial Six Sigma umbrella included SPC, ADT, and PE. Later, they added Design for Manufacturability (product capability and product complexity), accomplishing quality through projects and linking quality to business performance.[4]

Meeting the challenge Galvin had set in 1981 to improve quality by tenfold and developing Six Sigma helped Motorola to win the first Malcolm Baldrige National Quality Award in 1989. In line with Galvin's policy of openness and in response to the interest generated by the Baldrige Award, Motorola shared the details of its Six Sigma framework widely.

In the mid-1990s, AlliedSignal's Larry Bossidy and GE's Jack Welch saw in Six Sigma a way to lead their organizations' cultural change through Six Sigma initiatives and also achieve significant cost savings. In 1998, *Business Week* reported that GE had saved $330 million through Six Sigma, double

Welch's previous prediction. Interest in Six Sigma really took off after that article appeared, an interest that was fed by GE's continued success with Six Sigma and Jack Welch's speeches and books.

SIX SIGMA DEFINED

The Six Sigma of today speaks the language of management: bottom-line results. It institutionalizes a rigorous, disciplined, fact-based way to deliver more money to the bottom line through process improvement and process design projects—selected by the top leadership and led by high potentials trained as Black Belts or Master Black Belts in Six Sigma—that aim to create near-perfect processes, products, and services all aligned to delivering what the customer wants. In successful implementations, the majority of Six Sigma projects are selected for measurable bottom-line or customer impact that is completed within two to six months. The projects deliver through the application of a well-defined set of statistical tools and process improvement techniques by well-trained people in an organization that has made it clear that Six Sigma is a career accelerator.

In our practice, we see companies viewing Six Sigma in two ways: as a set of powerful tools for improving processes and products and as an approach for improving both the process- and people-related aspects of business performance. Six Sigma is used as a hands-on approach to developing leadership and change management skills. The companies that achieve the greatest benefits from Six Sigma leverage the linkages between people, processes, customer, and culture. In its 2000 annual report, GE describes the changes brought by Six Sigma this way: "Six Sigma has turned the Company's focus from inside to outside, changed the way we think and train our future leaders and moved us toward becoming a truly customer-focused organization."[5]

ANTECEDENTS OF SIX SIGMA

While Six Sigma was invented at Motorola in the late 1980s, Six Sigma has had antecedents over the past 100 years. In this section we highlight some of the important developments, methodologies, and lessons learned that Six Sigma integrates.

As far back as 1776, in *The Wealth of Nations,* Adam Smith identified the economies of scale made possible with specialization in manufacturing. During the early years of the twentieth century, systems were developed for disaggregating manufacturing work processes into subsystems and components in the effort to increase efficiency. Modern organizations are still based on the specialization of labor and the fragmentation of processes into simpler tasks. These principles are generally thought of as starting with Frederick W. Taylor and the scientific theory of management. We'll start our look backward with Taylor.

How Companies Define Six Sigma

It is enlightening to compare how various companies—including leading proponents of Six Sigma—define it for their employees and their customers.

General Electric: What Is Six Sigma?
The Road Map to Customer Impact

"First, what it is not. It is not a secret society, a slogan, or a cliché. Six Sigma is a highly disciplined process that helps us focus on developing and delivering near-perfect products and services. Why 'Sigma'? The word is a statistical term that measures how far a given process deviates from perfection. The central idea behind Six Sigma is that if you can measure how many 'defects' you have in a process, you can systematically figure out how to eliminate them and get as close to 'zero defects' as possible. Six Sigma has changed the DNA at GE—it is now the way we work—in everything we do and in every product we design."[6]

TRW: What Is Six Sigma?

"Six Sigma is a structured and disciplined, data-driven process for improving business. TRW is committed to the implementation of Six Sigma focusing on how we can dramatically improve our competitiveness by increasing customer focus, enhancing employee involvement, instilling positive change into our culture and ultimately creating bottom and top line growth. At the highest level, Six Sigma is all about satisfying customer needs profitably. It is a highly disciplined methodology that helps develop and effectively deliver near-perfect products and services. It will help TRW in all of our operations, engineering, manufacturing and staff areas."[7]

Honeywell: Six Sigma Plus

"Six Sigma is one of the most potent strategies ever developed to accelerate improvements in processes, products, and services, and to radically reduce manufacturing and/or administrative costs and improve quality. It achieves this by relentlessly focusing on eliminating waste and reducing defects and variations.

"Leading-edge companies are applying this bottom-line enhancing strategy to every function in their organizations—from design and engineering to manufacturing to sales and marketing to supply management—for dramatic savings.

"Now, Honeywell has developed a new generation of Six Sigma . . . Six Sigma *Plus* is Morris Township, NJ–headquartered Honeywell's principal engine for driving growth and productivity across all its businesses, including aerospace, performance polymers, chemicals, automation and control, transportation, and power systems, among others. In addition to manufacturing, Honeywell applies Six Sigma *Plus* to all of its administrative functions."[8]

Was Six Sigma Part of the Natural Progression of Quality, or Was It a Totally New Event and a New Thrust?

BOB GALVIN: *I think it was both. You could lean either way in terms of the natural intelligence that finally emerged. Was it a great discovery or just remarkably good mathematics and common sense? You can interpret it either way.[9]*

MIKEL HARRY: *I think Six Sigma is now squarely focused on quality of business, where TQM is concerned with the business of quality. That is, when you adopt TQM, you become involved in the business of doing quality, and when you adopt Six Sigma, you're concerned about the quality of business. In a nutshell, TQM is a defect-focused quality improvement initiative, whereas Six Sigma is an economics-based strategic business management system. Didn't start off that way, but it has evolved that way.*

So I see Six Sigma as a vector change. As I look across the history of quality from the era of craftsmanship, it's fairly continuous; each step is a logical continuance of the preceding step, built off the same fundamental core beliefs and principles, whereas Six Sigma represents a radical departure from that continuum. It's actually a reassessment of quality from a whole new perspective and frame of reference. It's a reinvention of the history, if you will, but it's a birth of a new history, and that's the way to say it. It's been the evolution of a business management revolution.[10]

1900 to 1920s: Scientific Management and Statistics

Taylor and Scientific Management. Frederick W. Taylor's techniques, which became known as *scientific management,* made work tangible and measurable through analyzing manufacturing processes and turning them into a set of tasks that could be standardized and made repetitive. With work fragmented into a multitude of tasks, a managerial system was then required to control work. The concept of the separation of planning and execution was central to Taylor's system. Taylor advocated planning departments staffed by engineers with the following responsibilities:

- Developing scientific methods for doing work
- Establishing goals for productivity
- Establishing systems of rewards for meeting the goals
- Training the personnel in how to use the methods and thereby meet the goals

Taylor's system dealt a blow to the concept of craftsmanship in managing work or quality as a single end-to-end process. In 1911, *The Principles of Scientific Management,* a collection of his writings, was published. By the 1920s, Taylor's methods were widely adopted and Taylor's ideas had influence across the globe.

Ford Assembly Line.   Henry Ford adopted four principles in his goal to efficiently produce an automobile at an affordable price: interchangeable parts, continuous flow, division of labor, and a reduction of wasted effort. Influenced by Taylor's ideas and Ford's own observations of improved work flow in other industries, the assembly of the Model T, first produced in 1908, was broken down into 84 distinct steps, with each worker trained to do just one. Ford had Taylor do time-and-motion studies to determine the exact speed at which the work should proceed and the exact motions workers should use to accomplish their tasks. In 1913, Ford's experiments and innovations came together in the first moving assembly line used for large-scale manufacturing. Ford's early methods are a foundation of Just-in-Time and Lean Manufacturing.

Walter A. Shewhart and Statistical Process Control.   Quality engineering can trace its origins to the applications of statistical methods for control of quality in manufacturing. Much of the early work was done at Bell Telephone Laboratories, where both Walter Shewhart and Dr. Joseph M. Juran worked in the 1920s. In 1924, Shewhart first sketched out the control chart. What has survived of that early work is the Shewhart control chart and what has become known as *Statistical Process Control.* Shewhart's work laid the foundation not only for the use of engineering methods to specify work processes, but also for the use of statistical methods that quantify the quality and variability of processes.

1950s: Deming, Juran, and Feigenbaum and the Japanese Quality Emergency

Japanese upper management—presidents and general managers—assumed the leadership of the quality function in response to the quality emergency of the 1950s. Shoddy quality had made Japanese goods uncompetitive. The postwar rebuilding of Japanese industry was seen by industry leaders as a unique opportunity to radically deal with this problem.

Dr. W. Edwards Deming, Dr. Armand Feigenbaum, and Dr. Joseph M. Juran are widely credited with helping the Japanese revolutionize their quality and competitiveness after World War II, and they served as consultants to the Japanese in the ensuing decades. The three became prominent in the United States after the Japanese quality revolution struck fear into American business. Although their contributions are many and complex, what we want to do here is simply point out contributions that are important to our understanding of the origins of Six Sigma.

Dr. W. Edwards Deming.   Known for introducing statistical quality control to Japan, Deming also placed great importance on the responsibility of management, believing it to be responsible for 94 percent of quality problems. Deming is also associated with the "plan-do-check-act" (PDCA) cycle as a universal improvement cycle (also known as the Shewhart cycle, as Shewhart first advocated its use).

Dr. Joseph M. Juran.   Juran developed the quality trilogy—quality planning, quality control, and quality improvement. Juran associated quality with customer satisfaction and dissatisfaction, emphasized ongoing quality improvement through a succession of improvement projects, and believed upper management leadership of the quality function was critical. Juran also emphasized reducing the cost of poor quality as a key to competitiveness.

Dr. Armand Feigenbaum.   Known as the originator of "total quality control" or "total quality," Feigenbaum defined *total quality* as an effective system to ensure production and service at the most economical levels that allow customer satisfaction.

1960s to 1980s: Japanese Quality Revolution

Japanese companies chose to train almost all managers in the science of quality. Unlike in the West, quality responsibility and training were not confined to members of specialized quality functions. From the 1950s onward, Japanese companies undertook a massive training program in quality for employees and instituted annual programs of quality improvement. They also instituted a project concept of quality improvements. Improvement breakthroughs were made project by project under the guidance of managers who selected the improvement projects and mobilized and guided project teams.

The Toyota Production System (TPS).   TPS is perhaps the premier example known in the West of these Japanese methodologies. Its practices—kanban and quality circles, for example—have been widely studied and used in the West, often without achieving the same results. In the 1970s, TPS was equated with Just-in-Time production methods. Stephen Spear and H. Kent Bowen believe the reason that U.S. companies have rarely achieved the kind of results that Toyota has is that they confuse the tools with the system itself. According to Spear and Bowen's research, four basic rules capture the tacit knowledge that underlies the Toyota Production System:

1. All work shall be highly specified as to content, timing, and outcome.
2. Every customer-supplier connection must be direct, and there must be an unambiguous yes-or-no way to send requests and receive responses.
3. The pathway for every product and service must be simple and direct.

4. Any improvement must be made in accordance with the scientific method, under the guidance of a teacher, at the lowest possible level in the organization.[11]

In this system, expert knowledge requires the addition of the knowledge of the people doing the work to improve the process; the people doing the work need the guidance and help of leader-teachers to apply the scientific method in a controlled project to achieve improvement. In the Toyota Production System and in Japanese concepts of quality in general, processes, people, and behaviors are seen as inextricably linked in a culture of continuous improvement.

1980s to 1990s: The American Quality Movement

Loss of market share, especially dramatic in the automotive and electronic industries, ultimately led to a reinvention of manufacturing in North America, beginning with the rediscovery of Statistical Process Control (SPC) and the introduction of quality circles, through Just-in-Time (JIT) and Total Quality Management (TQM) to business process reengineering (BPR) to Lean Manufacturing and Six Sigma.

Just-in-Time and Lean Manufacturing.   Lean Manufacturing represents a rebirth in the United States of the powerful methods and concepts of the Toyota Production System, and Chapter 6 of this book is devoted to it. We will just say here that JIT, like its predecessor, failed in many cases because its implementation focused on the tools and characteristics rather than on the underlying principles of TPS. Lean and Six Sigma are used side by side in some organizations.

Total Quality Management (TQM).   In application, TQM generally focused on organizational results rather than on business results. Although the mantra of customer focus was chanted, the tools for integrating what the customer required were not rigorous. Also, even while having a mind-set toward improving processes, entrenched Taylorism, along with the tendency of companies to ghettoize these improvement efforts as engineering and quality disciplines, have led to overall disappointment with TQM. TQM evolved during the mid-1980s into the first generation of Six Sigma at Motorola.

Business Process Reengineering (BPR).   Michael Hammer and James Champy's message on business process reengineering, introduced in the early 1990s in *Reengineering the Corporation,* was welcome to an audience disenchanted with TQM and ready to use its new IT horsepower to automate processes and in doing so to tighten processes and eliminate unnecessary and redundant steps. Executives were looking for business results, not just organizational results.

TQM, JIT, Lean, and BPR see work as a set of interrelated processes, reintegrating what was decomposed by Taylorism into isolated tasks. Process performance improvement is the focus.

Second Generation of Six Sigma

To put Six Sigma in perspective, we started by discussing the beginnings of Six Sigma in the 1980s and then its antecedents from the early twentieth century to the recent history of TQM, JIT, and Lean. The Six Sigma of the late 1980s and early 1990s—the first generation—was part of continuous improvement or total quality efforts at companies that were led for the most part by quality professionals. These efforts often became islands of isolated change that died when unsupported by the business leadership. What can be called the second generation of Six Sigma can be fairly said to have first emerged at AlliedSignal in 1994, where it was led by CEO Larry Bossidy. Hallmarks of the second generation are that Six Sigma is part of the corporate business plan and is key to achieving business objectives, with top leadership support and often intimate involvement. Another key difference from the first generation is that the second generation of Six Sigma starts with the *Voice of the Customer.* In its first generation, Six Sigma process improvement methodology included four logically linked phases: *measure-analyze-improve-control.* In the second generation, during the GE Capital deployment in 1995, a new first phase, *define,* was added, becoming the DMAIC methodology now used in most Six Sigma implementations. In the define phase, data is used to verify customer needs and requirements and to identify the Critical-to-Quality characteristics for customer satisfaction. The define phase guarantees that the Voice of the Customer is central to every Six Sigma project by adding rigor to the front end of the methodology. Thus, Six Sigma has the potential to

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Wasn't GE Capital the First Business to Add the D to the MAIC Road Map?

Had to! We didn't know where to start. We had to start with define. *We couldn't see our processes. If I were, say, manufacturing a widget, if I wanted to fix this problem, I would know that it came from this part of the assembly line. I could see it. But without D, you didn't understand where you were starting. You didn't understand process mapping. You didn't understand what a process was like. By the way, even the word* process *wasn't well understood in financial services.*[12]

Interview with Ruth Fattori, Executive Vice President for
Process & Productivity, Conseco

create processes with maximum efficiency and effectiveness. And by integrating process improvement (DMAIC), process, product and service design (i.e., Design for Six Sigma, or DFSS), and process management into a comprehensive approach to implementing business strategy, Six Sigma finally evolved into a program that could be used to drive the business instead of narrowly focusing on quality.

In the May 2002 issue of *Six Sigma Forum,* Matt Barney of Motorola tells how the second generation of Six Sigma differs from the first generation at the place of Six Sigma's birth:

> While Six Sigma was originally created as a continuous quality improvement technique, today it is significantly different than the Total Quality Management (TQM) approach of the 1980s. [Here are] the key differences between Six Sigma and TQM:

Six Sigma	Total Quality
Executive ownership	Self-directed work teams
Business strategy execution system	Quality initiative
Truly cross-functional	Largely within a single function
Focused training with verifiable return	No mass training in statistics and quality
Business results oriented	Return on investment
	Quality oriented

> . . . The next generation Six Sigma is an overall high performance system that executes business strategy.[13]

Six Sigma: A Critical Difference.   No less an authority than Dr. Joseph M. Juran has said that while he does not see any significant advances in Six Sigma, he does think it has succeeded in gaining the participation and commitment of top leadership, a critical success factor that every other process improvement program failed to achieve, with a few notable exceptions, such as Motorola under Bob Galvin's legendary leadership.[14]

Evolution to a Revolution.   What makes Six Sigma so attractive is that it integrates a great deal of what we have learned about getting sustainable results in manufacturing and services. But in seeing Six Sigma as part of that evolution, it would be a mistake to think of Six Sigma as about evolutionary, incremental improvement. From the stretch performance targets set for Six Sigma projects to transforming the mind-sets of the current generation and next generation of leaders through Black Belt and Master Black Belt training and successful projects, Six Sigma is about big paybacks and big impacts on culture and leadership.

LEVERAGING PROCESSES, PEOPLE, CUSTOMERS, AND CULTURE

The world is concluding that the way to become a world-class company is to create superior process performance, as that is what ensures superior products and services for customers. Superior process performance maximizes value for the customer and the shareholder. The beauty of Six Sigma is that it can be applied again and again to improve processes or to design new processes that continuously align the company with changing customer needs and wants.

Change is always difficult. Established organizational structures and expert functional areas are resistant. To change the way work is done in the hierarchical structures that are today's corporations, leaders need to drive the effort. An advantage of Six Sigma is that it requires leaders to be actively engaged in leading the pursuit of customer satisfaction. Also, the idea of process improvement through projects that is at the heart of Six Sigma is very powerful because it leverages the human factor in change at both the leadership and the process levels. The people who work in the process become the change agents using the Six Sigma tool kit. Changing processes changes behavior.

However, changes in culture—the "collection of overt and covert rules, values, and principles that are enduring and guide organizational behavior"[15]—can only be driven by the organization's leaders. To effect cultural change with Six Sigma, it must be aligned with strategy and leader behavior.

What Were Some of the Things That You Saw Leaders Do That Were Really Helpful?

They really bought in. The buy-in has to be demonstrated in their actions and through their words and their support and asking questions. And more important, they gave us the resources and the time. I would not work in a company where they wouldn't put in the resources. Because the problems have been there all that time, and people have known about them and people have wanted to fix them. They may not have always had the tools, but people do want to make improvements. People want things to work. But they don't have the time. It's hard to do your job and do it well and fix some of these bigger problems. And I think that once management dedicates the resources, which is a big expense, they will want to see what they get for their money, and to me, that really reflects their commitment.[16]

Interview with Ruth Fattori, Executive Vice President for
Process & Productivity, Conseco

Here are some ways in which leaders reinforce the kind of culture and organization they wish to create:

- By what they pay attention to, measure, and control
- By their reaction to critical issues in the organization
- By the way they model the role, teach, and coach
- By their criteria for rewards, promotion, and hiring
- By the questions they ask

When asked what role leaders need to play when driving change in their companies, Kenneth W. Freeman, chairman and CEO of Quest Diagnostics Incorporated, gave the following advice:

If you want to drive change in a company, you have got to do it with more than words. Yes, communication is vitally important. But you have to mesh that communication in terms of where you want the company to go with actually providing some participation on your own end in terms of modeling the behavior you want to have happen. This may sound kind of old-fashioned, but I really believe that in corporate America today, there are not *a lot of companies where senior leaders are really willing to roll up their sleeves and do the work. Many people say that a CEO's role is to delegate—just set the pronouncement and then come back next week or next month to make sure they did it. That's fine for some companies, but I think if you really want to drive permanent change, you need to put your feet, not just your mouth, into the game. That is the single biggest thing a leader can do. My job is to set the example in driving accelerated commitment and strong performance.*[17]

James Champy, in *Reengineering Management: The Mandate for New Leadership,* says that management's agenda needs to be redefined: "If you haven't gotten it by now, let me say it plainly: Purpose, culture, process, and people replace strategy, structure, and systems as our superordinate questions."[18] Commitment to Six Sigma puts purpose, culture, process, and people—including the customer—squarely on the leader's agenda.

WHERE IS SIX SIGMA GOING?

Process-centered organizations delivering products and services that meet or exceed customer expectations call for new management paradigms and new leadership skills. Becoming a Six Sigma company versus a company doing Six Sigma, as Ken Freeman of Quest Diagnostics puts it, is a journey of risk and challenge, but the risks can be offset and the challenges met by two unique aspects of Six Sigma: its ability to develop change leadership skills and its unrelenting focus on satisfying the customer.

Six Sigma helps leaders define the future: the kind of work people will do, the skills that are needed, the ways performance will be measured and

> **Have You Found Six Sigma to Be a Way to Develop the Leadership Pool within Organizations? Should This Be a Conscious Goal of Implementing Six Sigma?**
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> *It has to be. If you are trying to change the cultural mind-set of a business, the best way to do that is to start with your highly-promotable people, they are the ones that tend to get more done. They are also the ones who will be the leaders of the organization. So, if they go in with the new mind-set, you have a much greater chance of fundamentally changing the way people in the company work.[19]*
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> Interview with Dave Cote, President and Chief Executive Officer,
> Honeywell International

rewarded, the careers of the future, the role managers will play, and how strategy will be executed.

Results are achieved through people. With Six Sigma, work and the people who do it are refocused from tasks to processes. Six Sigma gives everyone in the organization a common language and set of tools for achieving what is valuable to the customer. Scientific management applied to employees doing tasks is replaced with the scientific method being practiced by every employee working in a process. Bill Quinn of Johnson & Johnson, where Six Sigma is part of its Process Excellence initiative, eloquently expressed the vision of what it means to be a Six Sigma company in our interview with him, and we don't think we could say it any better:

I would love to see it continue to grow and expand to every outpost within Johnson & Johnson. I would like to see it become the language of improvement within Johnson & Johnson, and I think that's something that time and emphasis will help us get to. I would like to see it help us meet our business targets and surpass them for both top-line and bottom-line growth. I'd like to see it help us meet our responsibilities to our customers and to regulatory bodies around the world, so that the products and services that we make are flawless or virtually flawless . . . that we use it as a way to complement our efforts from the regulatory standpoint and we live up to our regulatory responsibilities around the world . . . that it helps us live up to our environmental responsibilities, both regulatory and just doing what's right around the world, as a corporation and as a global citizen. I'd like to see Process Excellence help our leaders become extremely focused on results. I'd

like to see them use facts and measurements very wisely to help them provide direction in the organizations and to help them ensure that we get these fantastic business results. I'd like to see it help employees throughout Johnson & Johnson find ways that they can be successful, so that there isn't a problem that they feel that they can't solve, where they can use the input, not only the methodologies, but the leadership system, to be able to benefit not only the company, but also themselves through the thrill and the exhilaration of achievement, of having solved things that people before them haven't been able to solve. That's a wonderful thing. When you do that, then our customers end up with products that are far better than they've ever had. Employees have far more opportunity and satisfaction. The local community is better off because we're leading, we're going well beyond our compliance to local regulations, and we're pleasing our shareowners, too. That's what I would like to see, and I think Process Excellence can play a substantial role in helping us do that.[20]

CONCLUSION

Six Sigma is becoming a cornerstone philosophy among the world's leading corporations because it has proven itself by generating substantial business returns. Six Sigma is also seen as a great training ground for twenty-first-century leadership. It is now fairly commonplace for people who are well-trained in Six Sigma to achieve top leadership positions.

It is only fitting to end this chapter with words from Six Sigma's staunchest champion, Jack Welch: "We believed then and we are convinced today . . . that there is an 'infinite capacity to improve everything'—but there was no methodology or disciple attached to that belief. There is now. It's Six Sigma quality, along with a culture of learning, sharing, and unending excitement."[21]