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Six Sigma: The Breakthrough Management Strategy Revolutionizing the World's Top Corporations

Mikel Harry and Richard Schroeder
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REVIEWED BY EDWARD J. PHILLIPS CMC

The jacket copy and preface of this book say that Six Sigma is a business process that enables companies to increase profits dramatically. Six Sigma streamlines operations, improves quality, and eliminates defects or mistakes in everything a company does, from filling out purchase orders to manufacturing airplane engines. Much broader than a traditional quality program that simply detects and corrects defects, Six Sigma provides specific methods to re-create the process itself so that errors, defects, or mistakes are never produced in the first place.

The authors Mikel Harry and Richard Schroeder state that the Six Sigma technique had its birth and development in the late 1970s and mid-1980s at Motorola. But the original roots of Six Sigma are found in Philip Crosby's 1979 book *Quality Is Free*. The new Six Sigma is actually a philosophy that builds on the time-proven techniques of Statistical Process Control (SPC) and Total Quality Management (TQM). That does not diminish credit for this latest work on Six Sigma, as the authors have added significant insights and methodology to Crosby's original work.

In the mid-1980s, Mikel Harry was a senior staff engineer at Motorola and

Richard Schroeder was vice president of customer service at a Motorola subsidiary. Following up on some earlier internal studies prompted by Crosby's work, Motorola began to recognize the correlation between overall cost and quality, and the truth that the highest quality results in the lowest costs. Harry, one of the original architects of Six Sigma, formed a team of engineers to experiment with problem solving through statistical analysis, and subsequently formulated a method to apply Six Sigma throughout Motorola.

Soon Richard Schroeder heard about Harry's accomplishments with Six Sigma and applied the methodology in his areas of responsibility at Motorola. The results there were a 58% reduction in the cost of quality, a 40% reduction in errors, and a 60% reduction in the time it took to design a product.

In the early 1990s, both Harry and Schroeder left Motorola and joined Asea Brown Boveri's transformer business. There they shifted the Six Sigma focus from controlling defects to reducing costs and delivered nearly \$1.8 billion in savings over two years. With these accomplishments in hand, Harry and Schroeder left Asea Brown Boveri in 1994 to form their own organization, the Six Sigma Academy in Scottsdale, Arizona. Interestingly, they now compete with Motorola University in offering Six Sigma training programs.

I was Technical Operations Manager in Motorola's Systems Division when Six Sigma first emerged, and I can attest to the quality problems Motorola was having in the mid- to late '70s. The prime focus of many of the manufacturing

managers at that time was to "make the month." Loosely translated, this meant those managers had to make their handed-down-from-the-top shipment numbers *or else*. "Or else" generally meant a transfer to a less prestigious position and a halt to a promising career. We joked that one of the portable radio plants packaged and shipped common building bricks in order to make their numbers. It's not that quality was totally disregarded at Motorola, and a manager's quality performance *was* measured, but upper management at the time generally thought increasing quality meant increasing cost. The use of Six Sigma proved the opposite was true.

Six Sigma basically is about "asking tougher and tougher questions until we receive quantifiable answers." The system focuses on metrics and stresses that we cannot change what we cannot measure. The word *sigma* refers to the Greek symbol for standard deviation, which is a statistical measure of variability. Most corporations today operate at a three- to four-sigma level; that roughly translates to 67,000 and 6,200 defects per million opportunities, respectively. By literal definition, achieving Six Sigma performance means achieving a defect level of only 3.4 defects per million opportunities.

That may seem impossible until one realizes there are a very high number of opportunities in most organizations that can cause defects or errors. For example, I recently worked with a relatively small distributor of automotive repair products that did no manufacturing. In an informal survey, their customers stated they were one of the best suppliers in the business, since along with their orders,

they always seemed to receive something extra that was not ordered! Order accuracy was, indeed, a very large problem for the company. Overlapping Six Sigma with elements of Lean Distribution, we mapped the steps of the order processing procedure (the internal value stream) from the point and method of order-receipt, through the warehouse, and on to loading the outbound truck. Our gross analysis found 57 opportunities for error! A more detailed analysis would probably have shown more than 100. We immediately developed a plan to eliminate these opportunities for error. Consider: If there are that many opportunities to eliminate mistakes and their attendant costs in just the order-processing function of a small company, what are the opportunities in a major corporation?

Harry and Schroeder say the Six Sigma system is not just another quality fad or buzzword that applies only to manufacturing and reducing product defects. Six Sigma, they assert, can and should be applied to almost all processes in all companies, including service and office functions. Six Sigma is not just about reducing defect levels by improving processes—it is about building profitability and market share.

For those readers who are intrigued by Jack Welch and General Electric's success, there is an entire chapter devoted to how Six Sigma was instituted throughout GE, and a brief discussion of the original "Work-Out" initiative started by Welch in 1988. There is also a full chapter devoted to Polaroid, but more about that later.

After the initial Six Sigma definition and some examples of metrics, the book focuses on how to achieve the goal of Six Sigma. The so-called Breakthrough Strategy is "the means to achieve that goal through a highly focused system of problem solving. Six Sigma is the Land of Oz; the Breakthrough Strategy is the Yellow Brick Road that takes us there." This road-map section of the book is very well done—except for the heavy emphasis on employing "black belts." In my opinion, the concepts and techniques discussed in the book for achieving Six Sigma should be useful for anyone, whether or not they have achieved some form of "belt" status.

There is no question that Six Sigma is a strategy that should be reviewed by all management teams and pursued in one form or another. Yet, there are questions about how effectively Six Sigma helps significantly distressed companies. In the book, Six Sigma is touted as one of the best and most successful improvement systems, employed by companies such as Asea Brown Boveri, AlliedSignal, General Electric, Motorola, Texas Instruments, Polaroid, and Raytheon. But we must wonder about those claims, given the recent poor performance of many of those companies. For example, Motorola has exhibited lackluster, hit and miss, performance over the last few years and has laid off more than 45,000 employees. Raytheon earned less than 1% of sales in 2000. In 2001, Texas Instruments and Asea Brown Boveri lost \$210 million and \$698 million respectively. And Polaroid—well, the book (published in February 2000)

claims Six Sigma is helping Polaroid "add 6% to its bottom line each year." Polaroid, although still operating, declared bankruptcy in October 2001 and is currently selling off its assets. The authors try to circumvent some of these late-breaking facts by saying early on that "Six Sigma applies to products and service, not the companies who create them. Recent business history has shown that a company with Six Sigma can still be in financial disarray." We should not conclude that these instances of poor performance are correlated with implementation of the Six Sigma system. These companies probably would have performed far worse if Six Sigma *had not* been implemented. But the authors' claims need to be qualified more than they are.

In any case, anyone who is keenly interested in process improvement should read this book, particularly the chapters devoted to General Electric and the measurement discipline inherent in the Six Sigma approach. Consultants to management are truly agents of change, and Six Sigma, when implemented effectively, should force positive change throughout any organization.

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