

The Mists of Six Sigma

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“If I try to thank all the people claiming credit for this movie, I wouldn’t know where to begin.” – Bill Murray, accepting a Golden Globe award for his role in the movie *Lost in Translation*

Everyone interested in business processes seems to know that Six Sigma was invented at Motorola and that Motorola became the first winner of the Malcolm Baldrige Quality Award in 1988. The origin of Six Sigma has been the subject of countless articles, a series of Harvard Business School cases, and many books. What happened 20 years ago might not matter much anymore except that many practitioners continue to refer to the Motorola experience for inspiration and practical models. Meanwhile, as someone who was present at the dawn of Six Sigma and a participant in the early design of Motorola’s approach to process improvement, I am often amused, and sometimes appalled, at the descriptions I’ve read in various publications.

So this is a recitation of some of the myths versus the realities, from my personal point of view. I was hired by Motorola in 1981 as a member of the Motorola Training and Education Center (MTEC), the start-up corporate training department that evolved into Motorola University. One of my assignments at MTEC was to work with consultant Geary Rummler and others to develop what became Motorola’s first process improvement methodology. And after being transferred to the Semiconductor Products factory organizations in the Phoenix area, I sold and participated in the first large-scale process improvement initiatives that gave Motorola its reputation in the field of process. So I had a unique vantage point, both as observer and participant. On the other hand, I didn’t see everything that happened, or know all the participants, so this article has a decidedly narrow view (my own) and a modest purpose (what I think really happened).

Myth #1: Six Sigma was invented by... me! No, me! Me, me, me!

“Motorola is where Six Sigma began. A highly skilled, confident, and trained engineer who knew statistics, Mikel Harry, began to study the variations in the various processes within Motorola.” – *Six Sigma for Everyone*, by George Eckes.

“Like many companies at the time, Motorola didn’t have one “quality” program, it had several. But in 1987, a new approach came out of Motorola’s Communications Sector – at the time headed by George Fisher, later top exec at Kodak. This innovative improvement concept was called “Six Sigma” – *The Six Sigma Way*, by Peter Pande, et al.

“Alan Larson, one of the early internal Six Sigma consultants who later helped spread the concept to GE and AlliedSignal.” – *The Six Sigma Way* by Peter Pande, et al.

“Six Sigma per se didn’t exist twenty years ago. Miraculously, a single individual working for a large corporation in a cubicle at a nondescript office building saw something...the late Bill Smith, a reliability engineer at Motorola in Arizona...” – *Six Sigma for Dummies*, by Craig Gygi, et al.

Jeez, what are the facts? Well, the biggest fact is that lots of people participated in the invention of Six Sigma over a long period of time, so there is plenty of credit to go around.

If you disregard the Charles Dickens quality of the quote about Bill Smith, it turns out to be the closest to the truth (except he didn’t reside in Arizona, Mikel Harry did). Bill Smith did write and circulate a technical paper on the definition of Six Sigma in the mid-80s, and it did influence the thinking of many people to move away from a narrow focus on defects to the concept of process capability. But did he single-handedly invent Six Sigma? Don’t think so. Truth is, the efforts to improve quality through use of statistics went back to the early 1980s, and the creation of Six

Sigma as a program was essentially a repackaging of tools and methods going all the way back to Deming.

And the rest? Call it the triumph of the visible:

Mikel Harry was initially a consultant, then an engineer at the Government Electronics Group in Arizona who got involved in capability studies, then became an instructor for Motorola's quality training programs and did so well that he migrated to Motorola University, became head of the Six Sigma Academy, and spoke to thousands of benchmarking teams about Motorola's accomplishments. Naturally enough, some people assume that he was not only a passionate advocate of Six Sigma, but also its inventor.

George Fisher was an up and coming executive who strongly supported quality improvement. And he became Motorola's CEO for a time. But did Six Sigma originate in his operation? That's where Bill Smith worked, so you can see how the assumptions might arise. But the concepts and tools that went into the Six Sigma program came from many different places within Motorola.

And Alan Larson? Never heard of him. But he probably never heard of me either. That's the point. So many contributors – to claim that any one person was the inventor is to fall prey to the "great man" fallacy that a major idea has to come from one person. If there is any truth to the theory, there would be several great men: Deming, Juran, and Geary Rummler, who provided the intellectual capital for Six Sigma.

Myth #2: Motorola won the Baldrige award because of its Six Sigma program

The Six Sigma methodology was formalized in the mid-80s at Motorola. The result was a staggering increase in the levels of quality for several Motorola products, and the inaugural Malcolm Baldrige Quality Award was bestowed on the company in 1988." – *Six Sigma for Dummies*

"Only two years after launching Six Sigma, Motorola was honored with the Malcolm Baldrige National Quality Award." – *The Six Sigma Way*.

Don't you think it odd that a company can be so successful with a new program that it earns a national award for its achievements in just two years? Yeah, exactly. Motorola won the Baldrige Award not because of its formal Six Sigma program that kicked off in 1987 but because it had made truly awesome improvements in both quality and cycle time over the preceding 8 years. Those achievements were a result of all the TQM and BPI efforts going on, and they weren't viewed as a single comprehensive program called "Six Sigma" or anything else...except in hindsight.

The Six Sigma goal was announced in 1987, and the methodology was packaged and rolled out in 1987-88. As a formal program, Six Sigma was barely in place when the Baldrige Award was obtained.

Six Sigma was a repackaging of tools and techniques already in place, and the program was rolled out because Motorola had essentially stalled in its improvement efforts. The company suffered a severe downturn in 1985-86 when Japanese manufacturers invaded the memories chip market and wiped out Motorola's memories division. The company went into shock, and it was not until mid-1987 that things stabilized and attention began to be paid to improvement. But by that point cycle time was more the focus.

Quality fell off the radar, partly because a lot of people were plain tired of the quasi-religious atmosphere that accompanied TQM and partly because managers began to recognize that some of the quality problems were due to wait times, inventory mismanagement, and other issues related to long cycle times.

The other driver for Six Sigma was the influence of its customers. One of Motorola's biggest customers was Ford Motor Co., which began to require Six Sigma quality and on-time performance. Its insistent demands were a huge impetus for the revival of improvement efforts.

Myth #3: Six Sigma was Motorola's approach to process improvement

In the early 1980s, Motorola's approach to quality was a quality circles program called participative management (or PMP). MTEC was created to produce training products to support that effort, at first primarily for factory production workers, and later for technicians and engineers. Those training programs were the origins of much of today's Six Sigma methodology. But none of it was considered "process improvement." The focus was on product defects; the word "process" referred only to the manufacturing process, and later to the product design process. Business processes were not what anyone meant by "process."

Meanwhile, MTEC brought in consultant Geary Rummler to help design a performance-based approach to the development of instructional programs. While working with the manager of the manufacturing curriculum, Paul Heidenreich, Geary conducted a broad study of manufacturing operations, using a variety of analytical tools that included process analysis. Paul recognized the potential value of these tools and sponsored the development of a training program that evolved into an approach to process improvement, called OPS. This program was the origin of what became the well-known Rummler-Brache process improvement and management methodology. It was applied in many Motorola organizations, usually to the issue of cycle time improvement, and achieved phenomenal results that were included in the 1988 Baldrige submission. OPS was aimed at business processes and management teams, while the quality programs were aimed at product design and manufacturing employees, which may be why for a time nobody put two and two together and saw that these efforts were – or should be – linked.

It was not until 1988, when process capability became of interest, and Rummler's approach to process improvement had become well known throughout Motorola, that the quality and process sides became joined. That year, MTEC (by then renamed Motorola University) issued its first Six Sigma training program that contained techniques from previous quality programs and Rummler's methodology.

According to Mark Schleicher, who also worked at Motorola University and developed that first Six Sigma training program, the Six Sigma initiative "made the quality message clear and consistent. It was not DMAIC at that time but a focus on variation and defects that link back to the customer via the product. The original emphasis was really Design for Six Sigma, linking the customer to both the product design and the manufacturing processes."

What does any of this history matter now? Here are a few lessons to consider:

- **Organizational transformations don't happen quickly.** Motorola's journey from duck to swan took the better part of 10 years, propelled by a series of business crises and a lot of fumbling around.
- **Most of the ideas came from outside.** Motorola deserves the credit for recognizing the importance of concepts in quality, process, and performance, and for opening its doors to new ideas, but virtually all the tools and how-to knowledge came from a large cadre of outsiders. Juran, Deming, Dorian Shainin, Richard Schonberger, and Rummler were the true sources of Motorola's approach. And the drumbeat of customer demand, from Ford and others, was also a source for both ideas and inspiration.
- **There was no grand plan.** Only in hindsight can a path be dimly seen. CEO Bob Galvin issued a challenge to the company in the early 1980s (10X improvement in 5 years) and then a second set in 1987 (100X improvement in 4 years), and the organizational

response both times was a lot of head scratching and scoffing. The man-on-the-street response to the call for Six Sigma in 1987 was simultaneously, “It can’t be done” and “We’ve already done that,” depending on your interpretation of what Galvin was asking for.

Yet much *was* accomplished. In addition to huge improvements in product quality and cycle time, Motorola succeeded in creating a strong organizational culture. By the late 1980s, no matter where you were in the company, no matter who you talked to, every last employee was keenly aware of the importance of meeting customer requirements and of producing world-class products quickly and flawlessly. Indeed, it is still an inspirational story.

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