SIX SIGMA—MOVING BEYOND THE HYPE

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SUMMARY

Six sigma quality is defined as achieving reduction in the variation which allows for a 1.5 sigma shift. It is also described as a philosophy, methodology, and a breakthrough strategy to solve problems. This forum presents an in-depth examination into the heads and tails of the six sigma quality concept. This session encourages discussion of the points versus the counterpoints to become better informed about the benefits of six sigma quality. The ultimate objective is to understand six sigma quality and place it in an appropriate context to reap the benefits (see Figure 1).

KEY WORDS

problem-solving, six sigma quality

HYPE VERSUS REALITY

Figure 1. Six sigma quality: Description of points and counterpoints.

No.	***Point***	***Counterpoint***
1	Short-term PPM = 0.001 Long-term PPM = 3.4 (Long-term is defined as one having a 1.5 sigma shift)	There is nothing outside 3 sigma (Gauss Photo on *Ten Deutsche Marks* bill, Shewhart 1931, Deming 1982, Neave 1990). Calculations outside 3 sigma have no actual relevance. Gauss model approximates actuality (100%) by a normal distribution where 3 sigma limits match actuality 99.73% of the time.
2	Process variation is half that of specification range or Cp = 2.	To reference specification limits while seeking breakthrough strategy, we undermine Taguchi teachings (Taguchi 1986). Taguchi teachings involve uniformity around a target with no reference to specifications. This definition helps define the problem.
		Once we surpass the Cp of 1, instability and target problems become major contributors to output variability. It is almost impossible to achieve Cp = 2 in presence of instability (Shewhart 1931) and target problems.
3	±1.5 sigma shift is assumed to arrive at 3.4 PPM.	Amount of shift and type of shift are a matter of discovery and not a matter of assumption.
4	Six sigma teachings include a wide variety of methods that can handle any problem situation.	Specific absence of: • Reliability methods • Multivariate methods • Observational studies • Robustness methods are noticeable in six sigma teachings.

Figure 1. (continued).

No.	***Point***	***Counterpoint***
5	Six sigma develops the expertise in statistical methods.	As a direct result of excessive concentration on methods during six sigma teachings, the focus on problems is less. Even though master black-belts work on actual projects, the guidance available to select the projects is minimal. The project presentations do not explicitly describe the roles that statistical methods play in creating breakthroughs. The following problems, which can bring handsome returns, are rarely selected for resolution: • Parts are good, but the assembly is bad—an industrywide puzzling problem. • Industry is using control charting to monitor instead of define problems. • More energy is spent in implementing horizontal systems than executing vertical systems.
6	Six sigma methods emphasize the teachings of statistics as a science of confirmation.	Problem solvers can effectively resolve problems by using statistics as a science of indication.
7	Documented case studies using the six sigma methods are presented as the strongest evidence for six sigma success.	Six sigma case studies illustrated on web sites are sketchy. There is no mention of any specific six sigma methods that were used to resolve the problems.
		Some of the web site case studies make problem solving seem like a one-shot proposition. To solve actual problems, it takes more than one shot. The improvement process is like a game of golf, there is no par 1 hole.
		We are unable to separate case study outcomes arrived at by the Hawthorne effect versus actual use of statistical methods.
8	Six sigma is a philosophy, methods, and strategies.	Six sigma is actually statistical methodology. It must be combined with engineering strategies such as: • Investigation before action. • Effective communication of the separation among instability, variation, and off-target conditions. • Discussion of the four engineering tactics: control, optimize, modify, and recreate (Bajaria and Copp 1991). • Use of the forgiving principle (Bajaria and Copp 1991). • Emphasis of engineering efficiency over mathematical efficiency: ⇒ Randomization versus turf check ⇒ Observational studies vs. factorial experiments

CONCLUSION

The usefulness of six sigma philosophy, methods, and breakthrough strategy can be limited if we are not conscious of or do not comprehend the counterpoints. The most practical approach is to interpret and adopt six sigma quality concepts to your specific problem-solving needs.

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