

Design for Six Sigma: caveat emptor

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Abstract

Purpose

The purpose of this paper is to describe the historical approach to concurrent engineering (CE) which has resulted in product line management (PLM) and then evaluates the theoretical models that have been proposed for design for Six Sigma (DFSS) in order to determine which model is able to provide the most consistent approach with historical development of PLM.

Design/methodology/approach

The approach begins with an overview of the approach taken by the Union of Japanese Scientists and Engineers (JUSE) in the development of a coherent quality methodology for structured analysis and problem solving – the Deming Wheel of plan-do-check-act (PDCA) which has become the standard model in Japanese total quality management to define a logical decomposition in process management. In Japan, PDCA is the single logical model which has been broadly accepted as the construct for understanding how to develop both strategic and operational quality methods. The second step in the approach is to examine a similar American development of the model for statistical problem solving that is applied in the Six Sigma method for statistical problem solving: define-measure-analyze-improve-control (DMAIC). Next, the paper examines the historical sequence in the way the product development process has developed over the past forty years, with emphasis on its military origins (especially CE) and which resulted in the generic model for PLM. The final part of this paper examines the models that have been proposed to implement DFSS over the past ten years and evaluate their logical congruence with the engineering community's design process.

Findings

Problems in alignment with the engineering design process were identified with all of the DFSS models and with the non-structured or "heuristic" approach to developing a coherent body of knowledge related to DFSS.

Originality/value

This paper provides a challenge to the quality community as well as to the academic community. The paper points out the need for rigorous examination of logical models that are proposed for guiding the thinking of practitioners in the use of quality methods for both the engineering of products and business systems. An expose of lack of rationality in the way an approach to DFSS has been investigated calls for more responsibility in the management of the development of this body of knowledge.

Keywords

- Six sigma Total quality management Research and development Production management

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Design for six sigma (DFSS) is the suggested method to bring order to product design. Hockman, Suh, and Paul, have noted that 70% – 80% of all quality problems are design related. Emphasis on the manufacturing side alone will concentrate at the tail end of the problem solving process. It is described as designing for six sigma using the product development process. The methodology is used to produce engineered plastics through a series of tollgates that describe the elements needed for completion of a stage. The best practices are used in each stage. Six Sigma: Caveat Emptor. Contact Dr. Ron Lasky. Contact. I am naturally proud of the Six Sigma Program I helped develop at Dartmouth. In developing the material we evaluated other programs. I was surprised at how "fluffy" many were. After looking at what was out there it is clear that the Six Sigma field has become a business. Since there are no real "standards" even some of the "name" programs in my opinion are too easy. A person could go through some of these programs and get a black belt and not know how to set up, run and analyze a DOE, establish an SPC program or trouble shoot data to see why the Cpk of a process is low. The Six Sigma methodology – Define, Measure, Analyze, Improve, Control, or DMAIC – is known for its ability to eliminate problems resulting from variability in manufacturing, engineering and transactional processes. There will be those times, though, when no improvement will enable an existing process to meet customer expectations. When this happens, a new process is required to replace the existing one, and the best way of developing that process is through DMAIC's companion methodology known as Design for Six Sigma (DFSS). Here are some key aspects to designing for Six Sigma: Understand Your Customers and the Capability of the Processes. One of the first things a DFSS plan must do is compare customer requirements and process capability. Design for Six Sigma: caveat emptor. March 2010 · International Journal of Lean Six Sigma. Gregory H. Watson. Innovative Design for Six Sigma (I-DFSS) is a methodology that combines innovative thinking with the analytical tools used for design into a single process. The total endeavour provides one coordinated effort that reduces development and cycle time, targets zero-defect process delivery, and produces better results. This paper describes how two revolutionary methodologies — Design for Six Sigma [Show full abstract] (DFSS) and the Ideation/TRIZ methodology (I-TRIZ) — have been integrated to ensure that new products are designed to meet Six Sigma levels and marketing plans.