Review on the TRIZ Master Dissertation of Dr. Mark Barkan

"TRIZ in a Bi-System with Lean Sigma"

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The research work is dedicated to exploring the possibilities of integrating TRIZ with Lean Sigma.

The Six Sigma system for quality improvement in products, services, and processes is a business-based system of using statistical analysis and customer-focused methods. It has been demonstrated repeatedly that a company that moves from three σ processes to six σ processes increases its profitability by 2-3 orders of magnitude, and that companies that use the Design for Six Sigma process create products and services with much higher levels of customer satisfaction and technical quality than those that don't.

Coupling TRIZ with Six Sigma produces these powerful results faster, since the breakthrough problem solving aspects of TRIZ can be focused on the profit opportunities identified by Six Sigma and the technology forecasting aspects of TRIZ can be focused on planning new products at the right time in the product life cycle.

There have been attempts of combining Six Sigma and DFSS with TRIZ matching TRIZ with both DMAIC (Define, Measure, Analyze, Improve, Control) and CDOV (Conceptualize, Design, Optimize, Validate) steps.

Topicality of the research.

Six Sigma, DFSS and Lean Sigma are well-established methodologies with many Fortune 500 and Fortune 1000 companies. Integrating them with TRIZ has a number of advantages:
- giving TRIZ a confirmed status in a standard product/process development/improvement process
- complementing TRIZ with quantitative tools bridging the conceptual design stage with engineering
- matching TRIZ and non-TRIZ tools for specific product development stages.

Research objectives.

The major goals of the dissertation research focus on some aspects of integrating TRIZ with Lean Sigma:
- need and possibilities of integration
- the best way of combining these methods as a bi-system
- validation of the developed approach

Scientific novelty of the research.

A new situation analysis process has been developed that integrates some TRIZ approaches (resource analysis, S-curve analysis, etc.) and quantitative Lean Sigma tools. The process can be used as a basis for further integration of these two methods TRIZ being a leading component of the b-system.

Practical significance and validation of the results:

- the developed roadmap and a set of recommendations for integrating Lean Sigma and TRIZ contributes to practicality of the research results
- Dr. Barkan performed a number of projects validating the proposed method in different industries. Taking into consideration that Six Sigma, DFSS and Lean Sigma are leading methodologies at a number of Fortune 500 companies (GE, ALCOA, Intel, GM, Navistar and others) the developed methods gives TRIZ an opportunity of faster deployment and proliferation.
- the developed method is being embedded into educational programs of the University of Tennessee, Knoxville, USA.

Comments on the dissertation flaws:

- it would be beneficial to develop a more granular integration of different TRIZ tools into specific DMAIC and CDOV stages as well as Lean Manufacturing stages (Value Stream Maps, Product Family Matrix, MUDA identification, Leveled Production, Standardized Work, etc.)
- more practical case studies would strengthen the dissertation illustrating the application of the method to specific projects

Conclusion

Despite the above-mentioned flaws the dissertation corresponds to the MATRIZ requirements of Level 5 Certification and Dr. Barkan can be entitled to be awarded the TRIZ Master qualification.

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