

Improvement of Process Competitiveness Using Intelligent Reference Models

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Abstract : Several methodologies are now available to conceive the improvements of a process so that it becomes competitive as for example total quality, process reengineering, six sigma, define measure analysis improvement control method. These improvements are of different nature and can be external to the process represented by an optimization model or a discrete simulation model. In addition, the process stakeholders are several and have different desired performances for the process. Hence, the methodologies above do not have a tool to aid in the conception of the required improvements. In order to fill this void we suggest the use of intelligent reference models. A reference model is a set of qualitative differential equations and an objective function that minimizes the gap between the current and the desired performance indexes of the process. The reference models are intelligent so when they receive the current state of the problematic process and the desired performance indexes they generate the required improvements for the problematic process. The reference models are fuzzy cognitive maps added with an objective function and trained using the improvements implemented by the high performance firms. Experiments done in a set of students show the reference models allow them to conceive more improvements than students that do not use these models.

Keywords : continuous improvement, fuzzy cognitive maps, process competitiveness, qualitative simulation, system dynamics

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