

Developing a Framework for Assessing and Fostering the Sustainability of Manufacturing Companies

Authors : Ilaria Barletta, Mahesh Mani, Björn Johansson

Abstract : The concept of sustainability encompasses economic, environmental, social and institutional considerations. Sustainable manufacturing (SM) is, therefore, a multi-faceted concept. It broadly implies the development and implementation of technologies, projects and initiatives that are concerned with the life cycle of products and services, and are able to bring positive impacts to the environment, company stakeholders and profitability. Because of this, achieving SM-related goals requires a holistic, life-cycle-thinking approach from manufacturing companies. Further, such an approach must rely on a logic of continuous improvement and ease of implementation in order to be effective. Currently, there exists in the academic literature no comprehensively structured frameworks that support manufacturing companies in the identification of the issues and the capabilities that can either hinder or foster sustainability. This scarcity of support extends to difficulties in obtaining quantifiable measurements in order to objectively evaluate solutions and programs and identify improvement areas within SM for standards conformance. To bridge this gap, this paper proposes the concept of a framework for assessing and continuously improving the sustainability of manufacturing companies. The framework addresses strategies and projects for SM and operates in three sequential phases: analysis of the issues, design of solutions and continuous improvement. A set of interviews, observations and questionnaires are the research methods to be used for the implementation of the framework. Different decision-support methods - either already-existing or novel ones - can be 'plugged into' each of the phases. These methods can assess anything from business capabilities to process maturity. In particular, the authors are working on the development of a sustainable manufacturing maturity model (SMMM) as decision support within the phase of 'continuous improvement'. The SMMM, inspired by previous maturity models, is made up of four maturity levels stemming from 'non-existing' to 'thriving'. Aggregate findings from the use of the framework should ultimately reveal to managers and CEOs the roadmap for achieving SM goals and identify the maturity of their companies' processes and capabilities. Two cases from two manufacturing companies in Australia are currently being employed to develop and test the framework. The use of this framework will bring two main benefits: enable visual, intuitive internal sustainability benchmarking and raise awareness of improvement areas that lead companies towards an increasingly developed SM.

Keywords : life cycle management, continuous improvement, maturity model, sustainable manufacturing

Conference Title : ICME 2017 : International Conference on Manufacturing Engineering

Conference Location : Sydney, Australia

Conference Dates : January 26-27, 2017