

Analyzing the drivers influencing the implementation of sustainable manufacturing practices using Interpretive Structural Modeling

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Abstract

Because of the increasing concern on sustainability issues such as scarcity of natural resources, rapid environmental degradation, unequal balance of social equities and global competitions, sustainable manufacturing strategies have recently received significant attention among the industry practitioners. Further, the customers are expecting low cost and environmental friendly products without compromising on quality. Therefore, manufacturing industries are now facing the challenge of producing low cost products by utilizing the resources effectively and at the same time by considering the environmental aspects. The main aim of the manufacturing industry is to adopt the sustainable practices in their existing supply chain, which lead to the reduction of natural resources, energy, and material usage. Sustainable manufacturing is a part of sustainable development, a framework that attempts to maintain a dynamic balance between economic, social and environmental concerns. For increasing the implementation of sustainable practices in manufacturing industries, it is necessary to understand what motivates people and what discourages them. The main objective of this project is to identify the drivers or factors influencing the implementation of sustainable manufacturing through literature and expert opinion. It is proposed to apply Interpretive Structural Modeling (ISM) tool as a methodology for analyzing the interaction among the drivers. In addition, MICMAC analysis is carried out to categorize the drivers based on dependence and driving power. The results of the ISM model indicate that use of personnel protective equipment; and effective utilization of resources are the top-level drivers. The results also show that environmental certification; and government policy and environmental regulations play a very important role in the effective implementation of sustainable manufacturing practices in industry. Further, by implementing the best practices, the manufacturing industry can produce sustainable products.

Keywords

Sustainable manufacturing, Drivers, ISM, MICMAC analysis

Biography

Sasikumar P. is working as a faculty in the Department of Industrial Engineering Technology at Higher Colleges of Technology, Abu Dhabi, United Arab Emirates. He received his Master of Engineering and Ph.D. degrees from National Institute of Technology, India. His research area includes Forward, Reverse and Closed-loop Supply Chain, Multi Criteria Decision Making, Mathematical Modelling, Optimization. He published 48 research papers in International Journals; 4 papers in International Book Chapter; 50 papers in International and National Conference proceedings. He published a book on “Reverse and Closed Loop Supply Chain Network – A Case of Recycling and Remanufacturing” in Lambert Academic Publishing, Germany. He is an Editorial Board Member and reviewer for many reputed International Journals.