

Abstract

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An Investigation into the Relationship between the Implementation of Lean Manufacturing and Energy Efficiency in Industrial Organizations

There is a general acceptance in literature that implementing lean manufacturing is concerning the effective utilization of available resources. Thus, it is argued that lean implementation may enhance, among others, energy efficiency. In accordance, Khalaf, et al. (2010) developed a conceptual model to illustrate how lean manufacturing implementation realizes improvements in energy efficiency through enhancing both labor efficiency and capacity utilization. Based on this conceptual model, a survey is performed with the aim to build mathematical models to validate these conceptually proposed relationships. The developed mathematical models revealed that implementing both the HRM and TQM bundles of lean practices have significant effects on improving labor efficiency and capacity utilization, respectively. Further, the analysis supported the argument that higher labor efficiency as well as higher capacity utilization leads to higher energy efficiency. These results empirically validates that lean manufacturing implementation significantly influence energy efficiency.