Integrated Evaluation of Manufacturing System Performance Using Analytical Hierarchy Process

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ABSTRACT

Productivity, quality and flexibility are critical performance measures for manufacturing systems. This research incorporated the measures of productivity, quality and flexibility, to establish an integrated evaluation model for system performance. After confirmed the inputs of a manufacturing system and also the definitions of productivity, quality and flexibility, this research achieved the follow results: 1.By the viewpoint of costs, this research established integrated measures, includes productivity, quality and also flexibility. 2.By the viewpoint of costs, this research established individual measures includes labor productivity, material productivity, capital productivity, energy productivity, manufacture process quality, consequence quality, equipment flexibility, labor flexibility, products flexibility and market flexibility. 3.This research integrated the measures of productivity, quality, and flexibility to a system ’ s performance measure by the method of Analytical Hierarchy Process (AHP). This research also calculated the weights of the individual measures by AHP, to provide the manager to determine distributes of resources. 4.At last, this research established a complete performance evaluation model, also with an example is adopted to validate and illustrate the process and function of the performance evaluation model.

Keywords : Productivity ; Quality ; Flexibility ; Analytical Hierarchy ; Performance Evaluation ; Manufacturing System

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