

# The Study of A Multi-Criteria Assessment Model for Material Substitutions and Key Performance Indication Management

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## Abstract

Owing to the trend of mass customization, it's impossible to fix the variation of product structure. In practice, adopting suitable policy for materials-substitution is a popular used method to meet customers' expectation. However, the managerial objectives of adopting materials-substitution are various and sometimes they are conflicts inherently. Therefore it needs a systematic analysis to find out the considered factors when set materials-substitution policy. In this research, an Analytic Network Process (ANP) based assessment model was constructed to link the relationship of management objectives and considered factors for materials-substitution. First, an expert questionnaire was used to filter out useful performance matrices that were used as the sub-criteria of the ANP model. Then, a real case was analyzed using the constructed ANP-based model to test the model's effectiveness. The results indicate that quality, product reliability and product design are the three significant critical factors that impact the decision of deciding materials-substitution policy. From the above factors, it's obvious that quality is the most influential factor when making materials-substitution decision which the same as practical experiences. That is, this proposed ANP-based assessment model is robust and effective for materials substitution management.

Keyword : Mass Customization; Analytic Network Process; Materials Substitution