

Multi-state Belief Probabilities-Based Prioritization Framework for Customer Satisfaction Attributes in Product Development

Speaker:

Dr. Bimal Nepal, Associate Professor, Industrial Distribution Program, Texas A&M University

Date:

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Location:

D3 W122


Abstract:

The traditional approach to prioritization of customer satisfaction (CS) attributes includes methods such as analytic hierarchical process (AHP) that do not consider the correlation among CS attributes. This paper presents an analytic network process based framework that allows decision makers to prioritize the CS attributes by considering not only the correlation among the attributes themselves, but also the cross correlation among attributes and factors. Furthermore, the proposed framework employs Bayesian Belief Network methodology to deal with uncertainty in prioritization process due to subjectivity of the information during the early stages of product development. The belief probabilities are expressed in terms of conditional probabilities that reflect the contribution of an attribute toward a given prioritization criterion. In addition, we propose a novel approach to estimate the belief probabilities by considering different states of an attribute such as strong, average, and null. This approach improves the precision of the belief probabilities that are usually estimated through expert interviews. The framework is illustrated with an automotive industry case study with results presented for two disparate vehicle types.

Biography:

Dr. Bimal Nepal is a Philipps'66 First Year Engineering Faculty Fellow and Associate Professor of Industrial Distribution in the Department of Engineering Technology and Industrial Distribution at Texas A&M University. Dr. Nepal's research interests include: manufacturing and supply chain systems optimization, engineering decision and risk analysis, transportation optimization, quality and reliability, and new product development. Bimal has authored over 80 refereed papers in leading journals and peer reviewed conference proceedings in these areas. His research has been funded by both government and private sectors including the NSF and DoE. In addition to several research and services recognitions, he is a recipient of numerous teaching awards at Texas A&M University both at the departmental and college levels. Dr. Nepal received Best Presenter Award at the Global Business, Economics and Finance Research Conference in UK in 2011. His article dealing with quality and process capability analysis of an automotive engine manufacturing plant won the Best Paper Award in 2008 for Engineering Management Journal. In 2013, he was presented with Outstanding Alumnus Award by the Industrial and Systems Engineering Department at Wayne State University. Most recently, he was honored

with 2016 William Keeler Awards for outstanding engineering contributions and the 2017 Association of Former Students Teaching Awards (College of Engineering) at Texas A&M University. He is a member of American Society for Engineering Education, American Society for Engineering Management, and a senior member of Institute of Industrial and Systems Engineers. He is an Associate Editor for Supply Chain Management track of Engineering Management Journal.

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