

An evaluation framework for product planning using FANP, QFD and multi-choice goal programming

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Abstract

Technological innovation and satisfaction of customer needs are the keys to survival and success for firms, especially in global competitive high-tech industries. Since new products are usually a source of new sales and profits, the success of new product development (NPD) is essential to maintain a competitive edge and to make a decent profit in a longer term. Therefore, how to develop products that deliver the quality and functionality customers demand while generating the desired profits becomes an important task for the manufacturers. In this paper, a framework with two phases is constructed for facilitating the selection of engineering characteristics (ECs) for product design. In the first phase, quality function deployment (QFD) is incorporated with the supermatrix approach of analytic network process (ANP) and the fuzzy set theory to calculate the priorities of ECs with the consideration of the interrelationship among factors and the impreciseness and vagueness in human judgments and information. In the second phase, multi-choice goal programming model is constructed by considering the outcome from the first phase and other additional goals, such as NPD cost and manufacturability, in the attempt to select the most suitable ECs. A case study of the product design process of backlight unit (BLU) in thin film transistor liquid crystal display (TFT-LCD) industry in Taiwan is carried out to verify the practicality of the proposed framework.

Keyword : New product development (NPD), quality function deployment (QFD), fuzzy analytic network process (FANP), multi-choice goal programming, TFT-LCD.