Inventory replenishment model using fuzzy multiple objective programming: A case study of a high-tech company in Taiwan

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Abstract

The progress in high technology has led to the widely use of thin film transistor-liquid crystal display (TFT-LCD). The evolution of the manufacturing technology of TFT-LCD keeps increasing the size of TFT-LCD since a larger TFT-LCD allows a larger display application and an improved productivity. However, as the size of TFT-LCD increases, the size of TFT-array substrates and color filter substrates has to increase simultaneously. This leads to a more complicated inventory problem of large-sized substrates. Therefore, this paper considers a color filter replenishment problem in TFT-LCD manufacturing with the consideration of storage space, yield rate, quantity discounts and multiple suppliers. We first formulate the color filter replenishment problem as a fuzzy multiple objective programming, and then a fuzzy multiple objective programming with assigned weights for objectives based on experts' opinions is proposed. An example with four cases is given to illustrate the practicality for empirical investigation. The results demonstrate that both methods are effective tools for inventory management of color filters for multi-periods. In addition, the methods can be applied or modified for managing inventory in general.

Keyword：Fuzzy multiple objective programming; Replenishment; Quantity discounts; Multiple suppliers.