

## FUZZY FACILITY SITE SELECTION MODEL BASED ON SIGNED DISTANCE METHOD

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*ABSTRACT.* We have developed a series of studies regarding the fuzzy facility site selection model. In this paper, we propose a new fuzzy assessment method to tackle the facility site selection based on signed distance method. The proposed fuzzy assessment method is not only suitable for the group decision making to evaluate the aggregative benefit for the facility site selection, but also, suitable for only one evaluator. Moreover, our result will be more objective and unbiased than before since it is generated by a group of evaluators. Via the proposed model, the decision-maker/leader of the multinational enterprises can select the appropriate facility site among the countries.

**Keywords:** Fuzzy sets, Triangular fuzzy number, Signed distance

**1. Introduction.** To assess and compare the aggregative benefit rate of the investment environment factors among the several countries is important for the decision-makers for the facility sites selection. Farmer and Richman [1] analyzed the international management significant factors systematically, and used the relationship among management processing factor, domestic environment factor and international environment factor for measuring. Stobaugh [9] proposed an evaluating environment model. This model can point out the appropriate place and time for investment, and divide the environment factors into country-related variables and product-related variables. Skinner [8] divided environment factors into three categories, such as economic, politic and society. For the above mentions, in order to select the appropriate facility site of multinational enterprises (MNEs), the decision-makers of MNEs should have an evaluating aggregative investment benefit rate of the investment environment factors model to simplify the selecting facility site among the countries. Based on [1-3,8,9], Lin and Lee [4] analyzed the facility site selection criteria for MNEs, and classified the investment benefit factors into five attributes as labor, geography, economic, reward, and politics, etc., and divided each attribute into some investment benefit items, such as salary level, manpower level, etc., to build a hierarchical structure model of aggregative benefit in investment environments. For convenience, they denoted the attribute Labor to be  $X_1$ , Geography to be  $X_2$ , etc., and the items such as Salary level denoted by  $X_{11}$ , Usage level of factory place denoted by  $X_{21}$ , etc., as shown in Figure 1 [4].

In evaluating the benefit rate of aggregative investment environments for MNEs, most decision-makers or leaders, in fact, viewed those assessment items as linguistic values