

UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

BOOKSTORE SELECTION BY USING
FUZZY TOPSIS

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IN THE NAME OF ALLAH, THE MOST GRACIOUS, THE MOST MERCIFUL

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ABSTRACT

Nowadays, in every business management, supplier selection is an important issue in order to select the right supplier that can reduce cost and time. Deciding the best supplier is complicated for Mathematics' lecturer because it is involving qualitative and quantitative criteria that should be considered. In this study, the Fuzzy TOPSIS is applied to select the better supplier when lecturer as a decision maker set the target value for each criterion. The criteria selected in this study are price, quality, delivery and warranty and the alternative is BNS Supply Trading, Delima Ilmu Enterprise and ABA Bookstore. Linguistic term described the rating of each alternative and the weight of each criterion that can be expressed in triangular fuzzy numbers. The distance is calculated between two triangular Fuzzy numbers. In this study, closeness coefficient is used to identify the ranking order of all alternatives by calculating the distance to both the Fuzzy Positive Ideal Solution (FPIS) and Fuzzy Negative Ideal Solution (FNIS). The result shows that Delima Ilmu is the best supplier because have the highest closeness coefficient values.

Keywords : TOPSIS, linguistic variable, FPIS, FNIS

1 INTRODUCTION

Supplier is a anyone who provide goods or services to a company or individual. According to Beil (2009), supplier selection involve the process by which a firm to determine, classify and bond with supplier. Supplier selection is the important activity in order to approach the objective in the company which is to meet the customers' demand. The best supplier that has been selected will give the profit to the company. Thus, the board of director of the company has to decide among them which supplier gives the best result after several tests been conducted on some criteria.

The decision maker of the company need to evaluate the criteria of the material needed from the supplier or the chosen alternative that supply the same material needed in producing a product. According to Ayhan (2013), there are two types of supplier selection issues. He added for one type of resource, one supplier can fulfill the whole purchaser's needs, while for numerous types of resources, no supplier can fulfill all the purchaser's necessities.

In order to select the better supplier among different alternatives, the suitable method needs to be chosen by the company with some research. According to Ayhan (2013) there are six technique including Analytic Hierarchy Process-AHP, Analytic Network Process-ANP, Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), mathematical programming (Linear Programming-LP, Goal Programming- GP or Mixed Integer Programming-MIP), probabilistic approaches, intelligent approaches (neural networks, expert systems), hybrid approaches (AHP-LP, ANP-MIP) and others.

According to Liao & Kao (2011), they introduced an integral fuzzy case-based reasoning and mathematical programming method in order to select the best supplier. Besides that Semih Onut (2009) built up a supplier assessment approach based on the ANP and TOPSIS method to help a telecom organization in determine their vendor. In addition, Liao & Kao (2011) have used a hybrid model that including AHP, DEA and NN approaches to the supplier