

UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

THE APPLICATION OF FUZZY TOPSIS METHOD
FOR
SELECTION OF COURIER SERVICES IN
MALAYSIA

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

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ABSTRACT

In today's competitive business world, it is extremely important for decision makers to have access to decision support tools in order to make quick, right and accurate decisions. One of these decision making areas is courier service selection. Courier service selection is a multi – criteria decision making problem that deals with the optimization of conflicting criteria on which decision maker's knowledge is usually vague and imprecise. In this project, fuzzy TOPSIS method is proposed to select appropriate alternatives. To gather initial data, a committee of three decision makers were asked by a questionnaire. In this questionnaire, the decision-makers use the linguistic weighting variables to assess the importance of the criteria. They use the linguistic rating variables to evaluate the rating of alternatives with respect to each criterion. Using fuzzy-TOPSIS approaches all criterion in hierarchy were ranked. Our findings demonstrated that using fuzzy-TOPSIS method price, timeliness, quality of information, services and warranty are the five first important criteria in order to rank each alternatives of courier services. Finally, a numerical example is provided to demonstrate the computational efficiency of the proposed fuzzy TOPSIS method.

1 INTRODUCTION

In this era of modernization, as time changes, there occurs the increasing in people demands. But there are some goods that need to import from another place around the world. So courier service is one of the solution of this problem. The purpose of this service is to send goods to anyone over the world in a very short time.

There are many business transaction happen through online and courier service is very importance in Malaysia nowadays. The word courier service can refer to every type of delivery either local or international. So nowadays people prefer courier service than regular mail service because the service is very high quality.

In this study, we apply the fuzzy TOPSIS method to select the best courier service in Malaysia. We have taken into consideration some important criteria which affect the process of selection of courier service such as price, timeliness, quality of information, service and condition/accuracy. In this paper, we have to calculate the weights for each criterion then input these weights to the TOPSIS method to rank courier service. The entire methodology is illustrated with the assist of a numerical example and finally the rank of each courier service is determined according to its results.

Some related definitions of fuzzy set theory adapted from (Zadeh, 1965) are presented as follows.

Definition 1. A fuzzy set \tilde{a} in a universe of discourse X is characterized by a membership function $\mu_{\tilde{a}}(x)$ that maps each element x in X to a real number in the interval $[0,1]$. The function value $\mu_{\tilde{a}}(x)$ is termed the grade of membership of x in \tilde{a} . The nearer the value $\mu_{\tilde{a}}(x)$ to unity, the higher grade of membership of x in \tilde{a} .

Definition 2. A triangular fuzzy number as shown in Figure 1 is represented as triplet $\tilde{a} =$