

**SUPPLIER SELECTION IN GOVERNMENT ORGANIZATIONS BASED ON  
FUZZY EVALUATION APPROACH**



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## 2. Letter of Offer (Research Grant)

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### KELULUSAN PERMOHONAN DANA KECEMERLANGAN 06/2011

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3. Bagi pihak Universiti kami mengucapkan tahniah kepada Y. Brs. Profesor/tuan/puan kerana kejayaan ini dan seterusnya diharapkan berjaya menyiapkan projek ini dengan cemerlang.

4. Peruntukan kewangan akan disalurkan melalui tiga (3) peringkat berdasarkan kepada laporan kemajuan serta kewangan yang mencapai perbelanjaan lebih kurang 50% dari peruntukan yang diterima.

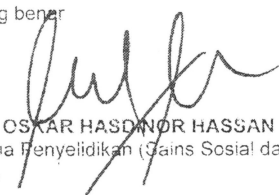
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Sekian, harap maklum.

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## **5. Report**

### **5.1 Proposed Executive Summary**

Supplier selection is one of the key aspects of supply chain management in government organizations. With the rising cost of raw materials and products, purchasers are forced to make better choices when selecting supplier.

While a guideline has been prepared by the management, supplier selection has been largely dependent on previous experiences and human judgements which are vague and immeasurable. No proper measurement has been done to support the decision. Hence, fuzzy approach is deemed to be the best solution when dealing with such subjective evaluation. Also, fuzzy numbers related to linguistic variables were usually fixed and were taken from previous literature. This does not necessarily reflect the actual respondents' opinions. Therefore, the linguistic variables involved in evaluating performance and importance level should be developed based on respondents' opinions.

This study presents a two phase methodology in evaluating and selecting supplier in government organisations. First, it aims to build fuzzy linguistic variables based on respondents' opinions on the evaluation criteria. Then, it proposes a fuzzy evaluation method in selecting the best supplier based on the given criteria.

A fuzzy evaluation method will be applied to deal with the uncertainty and ambiguity of human decisions in determining the importance level of criteria and the significance level of sub-criteria of suppliers. Then, ranking method will be applied to decide on the supplier that best satisfy all the given criteria.

It is hoped that the proposed method will be an alternative way of selecting suitable supplier and contribute towards improving supply chain management in government organisations.

## 5.2 Enhanced Executive Summary

Asset purchasing is one of the main responsibilities of Information Technology (IT) department which involves selecting the best supplier. The IT department needs to consider many criteria such that the chosen supplier offers the best product and services at acceptable price, without compromising on the quality and standards of goods. Thus, supplier selection is a multi-criteria decision making (MCDM) problem.

In real practice, supplier selection is a complex decision making task. The evaluation process of suppliers relies heavily on previous experiences and human judgments which are vague and uncertain. It is relatively difficult for decision makers to provide exact numerical values for the criteria. Hence, fuzzy set theory was introduced to deal with uncertainties and imprecision in linguistic terms values in decision making processes.

Although linguistic terms are used in many fuzzy MCDM models, most of the corresponding fuzzy numbers were fixed and taken from the previous literatures. These fuzzy numbers may not necessarily reflect actual respondents' opinions.

Therefore, a two-phased fuzzy evaluation technique is proposed in evaluating and selecting suppliers. Firstly, triangular fuzzy numbers were built based on respondents' opinions. Fuzzy evaluation method is used to evaluate the suppliers based on three main criteria and nine sub-criteria. Finally, the suppliers were ranked using distance minimization method.

The case study was done in an IT unit of a public university in East Coast of Malaysia where four suppliers were evaluated by four decision makers (DMs) consisting of the top IT officers. Also, two sets of fuzzy linguistic questionnaires were built based on information collected from 20 individuals working closely with the IT unit. The final ranking of suppliers was obtained as  $S_1 \succ S_4 \succ S_3 \succ S_2$ , where  $S_i$  represents Supplier  $i$  for  $i = 1, 2, 3, 4$ .

The result has shown the applicability of the proposed method in IT supplier selection. It is interesting to explore the usage of this method onto other MCDM problems. However, the model did not consider outliers' data and future works on such case is recommended. It is hoped that the evaluation method could provide a more significant outcome.