

## ***ABSTRACT***

PT Universal Tekno Reksajaya (UTR) is a company specialized in recondition and maintenance of heavy equipment components. Support and facilitate the business to be executed, UTR require tools that are needed. UTR cooperate with vendors and would choose a vendor to ensure the availability of a tool. Decision-making by UTR is focused by choosing a vendor who offers the lowest price. However, choosing a vendor based on the lowest price offer is not efficient, and less than the maximum because there is no consistency in the use of vendor selection criteria. Therefore, UTR must be thorough and careful in determining the priorities among the existing criteria in order to target the right decision in accordance with the objectives of the company and doesn't cause any loss to the company.

In this study used the approach of Multiple Attribute Decision Making (MCDM) in selecting vendors to define the best alternative based on certain criteria. The method used in solving this problem is the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) because it can take into account all kinds of criteria (subjective or objective) with the principle that the alternatives selected must have the shortest distance from the ideal solution for determining the relative proximity of a alternative to the optimal solution. Weight to each criterion was calculated by Fuzzy Analytical Hierarchy Process (FAHP) is the development of AHP with fuzzy logic that considers the uncertainty and doubt and minimize subjective ratings of the level of interest of the criteria established by the decision maker, with intervals at every rank.

Weight calculation generated by the system of criteria and sub-criteria normalized result is a warehouse with weights 0.0740, dropping off item with weights 0.0740, price with weights 0.1365, lead time with weights 0.1707, tool functions with weights 0.1882, condition of the tool with weights 0.1882, parts with weights 0.0748, and warranty with weights 0.0936. Results of testing the overall accuracy of the data with an alternative 2 vendor generates 78.1% accuracy rate, overall testing of data with an alternative 3 vendor generates accuracy rate of 81.9%, and overall testing of data with an alternative 4 vendor generates 80% accuracy rate. Average accuracy rate of the overall testing performed is 80%. The weights generated by AHP method is not same as that generated by FAHP method, but both have the same priority level, it makes a ranking conducted by TOPSIS with weights AHP and FAHP generates the same sequence.

**Keyword:** UTR, Vendor Selection, MADM, TOPSIS, FAHP