UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

COMPARATIVE STUDY BETWEEN ANALYTIC HIERARCHY PROCESS AND POTENTIAL METHOD FOR MACHINE TOOLS CONFIGURATION

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ABSTRACT

MCDM is a process of making decisions when several factors must be considered simultaneously to rank potential alternatives. To achieve goal, decision must be made, and correct decision can lessen the complexities and uncertainties of the outcomes. There are a lot of tools under MCDM, where AHP and PM are amongst them. However, PM is easily understood as it includes a graphical representation.

A case study titled "Use of AHP in decision-making for machine tool configuration for special purpose machines" (Farhan et al., 2016) shows that four levels of hierarchy structures was assessed and the necessary criteria and subcriteria were identified and used in the develop model. Then pairwise comparison matrices were created for each level to compute the weights for the alternatives. From the result obtained in the previous case study, we applied the potential method and created our own case study based on the use of PM.

In PM, there are seven steps that are needed to be carried out. We followed all the steps to rank all the sub-criteria and alternatives. The results obtained for the global weight are derived from the local weight of the comparison matrix of sub-criteria with respect to criteria. The result of global weightage ranking A5 as the most preferred alternative, A3 is the second most preferred alternative, A1 is the third most preferred alternative and A2, A4, A6 have the same rank making them the lowest preferred alternatives. The ranking of the alternatives obtained from this case study is exactly same as in the case study using AHP. We can conclude that PM can also be used in machine tool configuration of the special purpose machine with addition of graphical representation.