Use of Monte Carlo Simulation for Hybrid Multicriteria Decision Making Approaches

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Abstract (Times New Roman 10pt)

Rising need for competent personnel is maritime logistics is undeniable as the business grows globally especially after the pandemic Covid 19. Researchers have analysed the need for convenient methodology in selecting the candidates for expanding not only in a given country but worldwide. This study proposes criteria for needed talent in view of port logistics experts using of multicriteria decision making (MCDM) approaches which are the hybrid of analytical hierarchy process (AHP) with AHP, technique for order of preference by similarity to ideal solution (TOPSIS) and preference ranking organization system method for enrichment evaluation (PROMETHEE). In order to measure the performance of the three hybrid approaches, comparison with benchmark data from the previous study and real-world data are done. The benchmark data is adapted using Monte Carlo Simulation technique to match with the needed data for the new criteria. As Monte Carlo simulation is a type of simulation that relies on repeated random sampling and statistical analysis to compute the results, in this paper details description on the procedures is emphasized. Based on the results, it shows that AHP is the best MCDM method to rank the personnel in port industry by getting the highest Kendall's Tau coefficient with 0.619 coefficient compared to TOPSIS and PROMETHEE with 0.524 and 0.429 respectively. The same calculation method of Kendall's Tau rank correlation is used to reconfirm that the proposed weightage of the criteria agrees with the actual evaluation from a selected port organization.

Keywords: Performance measurement, Port Personnel, Monte Carlo Simulation, Multicriteria decision making (MCDM)

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