



INCORPORATING MULTI CRITERIA DECISION MAKING (MCDM) INTO GIS FOR OPTIMUM ROUTE LOCATION

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ABSTRACT

The research is intended to investigate and show the capabilities of GIS in railroad planning and stations location processes to connect Karbla and Najaf city south of Baghdad with the center and the south of Iraqi country by new railway as a case study. This study identified the information needs of different factors and evaluation criteria for locating stations and railroad planning. To achieve these objectives Spatial Multicriteria Decision Making processes for planning the rail stations and the route were designed and developed using GIS. The criteria which contributing in Multicriteria Evaluation method for creation rail stations suitability maps are two types; Constraints and Factors. The constraints are based on the Boolean logic, while the factors are based on Fuzzy logic. The relative importance of the parameters in rail stations location and rail route selection has been determined in cooperation with rail experts. The obtained scores were used in pairwise comparison to determine the weights of criteria maps related to these parameters. These weighted criteria maps were overlaid upon the other and suitability maps were created in GIS for rail stations location and rail route selection. The Weighted linear combination and The Analytical Hierarchy Process were used to derive these final suitability maps. The final maps created the optimum route for new railroad and by comparing and analyzing between this route and the Italian Company route, it was found that the route which suggested by this study is the best for its short path, minimum cost and suitable land use.

Keywords: Geographic Information System, Spatial Analysis, Analytical Hierarchy Process, Pairwise Comparison Matrix, Weighted linear combination, Multicriteria Evaluation.