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Selection of Best E-Rickshaw-A Green Energy Game Changer: An Application of AHP and TOPSIS Method

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Abstract. E-Rickshaw is an E-vehicle that has three wheels, a rechargeable battery driven electric motor as engine. E-rickshaw has become very popular due to low operating cost, low maintenance cost, eco-friendliness and ease of driving. It is perfect for small distance transport. As a last mile connector, it has transformed the public transport system in India. The low cost electric vehicle carries enough people to make a decent income and hence has become a source of livelihood for many. For considering the issues in this paper, detailed attributes of E-rickshaw are studied and Analytical Hierarchy Process (AHP) has been applied to calculate criteria weights for the sorted attributes. Subsequently, Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), a Multi Criteria Decision Making (MCDM) technique has been applied for the selection of best E-Rickshaw. In this paper, sensitivity analysis and comparative analysis have been conducted for further insight.

Keywords: AHP method, E-Rickshaws selection, sensitivity analysis, TOPSIS method

1. Introduction

The humble E-Rickshaw(ER) is the biggest invention that has happened in recent times. These E-Rickshaws have rechargeable battery driven electric motor. The low cost electric vehicle is cheap to operate, carries enough people to make a decent income, and is perfect for small distance transport. Indian roads are congested with ever increasing problems of parking and ER is perfectly suitable for running on narrow streets because of its small size. Additionally, this kind of rickshaw powered by electric and it does not cause any air or sound pollution. Hence it (see Fig. 1) helps to promote an eco-friendly transport system in India.

The biggest reason behind E-Rickshaws popularity in last ten years, is low operating cost, low maintenance cost, zero fuel cost, eco-friendliness and ease of drive. The battery-run three-wheeler has been accepted by passengers across the country for a short distance travel in the out skirts of metro cities as well as in small towns and even villages. Many rickshaw pullers are shifting from traditional rickshaws to the ERs as the latter saves physical efforts and the cost is within reach. The advantages of low cost

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