

Ranking Iranian accredited laboratories with Proficiency Tests using PROMETHEE method

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Abstract

The rapid pace of changing technology is leading to high rate of import and export between different countries. In outsourcing governmental organizations duties to private sectors, it is a need to control sectors and they should be under assessment policy. This research has been developed to show how the accredited laboratories of Iranian standard (ISIRI) can be assessed for their technical servicing using the PROMETHEE (Preference Ranking Organization Method for Enrichment Evaluations) method in combination with proficiency testing inter- laboratories comparison, in order to rank them for an urgent or crucial need of testing any kind of goods or products under compulsory regulation or national standard for their quality or safety aspect. The proposed approach, therefore, allows a decision to be made with confidence that the alternative (laboratory) chosen has best performance for conformity assessment.

Keywords: MADM, Proficiency Testing, PROMETHEE, Preference Function

1- Introduction

The PROMETHEE method (Preference Ranking Organization Method for Enrichment Evaluations), includes the PROMETHEE I for partial ranking of the alternatives and the PROMETHEE II for complete ranking of the alternatives, is one of the MCDA methods that was developed by Brans (1982) and further extended by Vincke and Brans (1985). Several versions of the PROMETHEE methods were developed to help in more complicated decision-making situations (Brans and Mareschal, 2005) such as the PROMETHEE III for ranking based on interval, the PROMETHEE IV for complete or partial ranking of the alternatives when the set of viable solutions is continuous, the PROMETHEE V for problems with segmentation constraints (Brans and Mareschal, 1992), the PROMETHEE VI for the human brain representation (Brans and Mareschal, 1995), the PROMETHEE GDSS for group decision-making (Macharis et al., 1998), and the visual interactive module GAIA (Geometrical Analysis for Interactive Aid) for graphical representation (Mareschal & Brans, 1988; Brans and Mareschal, 1994). Figueira et al. (2004) has recently proposed two extended approaches on PROMETHEE, called as the PROMETHEE TRI for dealing with sorting problems and the PROMETHEE CLUSTER for nominal classification (Behzadian et al, 2010). The methods of PROMETHEE have successfully been applied in many fields and a number of researchers have used them in decision-making problems. The PROMETHEE methods have some requisites of an