Extended Intuitionistic Fuzzy VIKOR Method in Group Decision Making: The Case of Vendor Selection Decision

Authors : Nastaran Hajiheydari, Mohammad Soltani Delgosha

Abstract : Vendor (supplier) selection is a group decision-making (GDM) process, in which, based on some predetermined criteria, the experts' preferences are provided in order to rank and choose the most desirable suppliers. In the real business environment, our attitudes or our choices would be made in an uncertain and indecisive situation could not be expressed in a crisp framework. Intuitionistic fuzzy sets (IFSs) could handle such situations in the best way. VIKOR method was developed to solve multi-criteria decision-making (MCDM) problems. This method, which is used to determine the compromised feasible solution with respect to the conflicting criteria, introduces a multi-criteria ranking index based on the particular measure of 'closeness' to the 'ideal solution'. Until now, there has been a little investigation of VIKOR with IFS, therefore we extended the intuitionistic fuzzy (IF) VIKOR to solve vendor selection problem under IF GDM environment. The present study intends to develop an IF VIKOR method in a GDM situation. Therefore, a model is presented to calculate the criterion weights based on entropy measure. Then, the interval-valued intuitionistic fuzzy weighted geometric (IFWG) operator utilized to obtain the total decision matrix. In the next stage, an approach based on the positive idle intuitionistic fuzzy number (PIIFN) and negative idle intuitionistic fuzzy number (NIIFN) was developed. Finally, the application of the proposed method to solve a vendor selection problem illustrated.

Keywords : group decision making, intuitionistic fuzzy set, intuitionistic fuzzy entropy measure, vendor selection, VIKOR

Conference Title : ICBA 2018 : International Conference on Business Analytics

Conference Location : Vancouver, Canada

Conference Dates : September 17-18, 2018