

## Chapter 45

# A Fuzzy TOPSIS+Worst-Case Model for Personnel Evaluation Using Information Culture Criteria

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### ABSTRACT

*Personnel evaluation process is aimed at choosing the best alternative to fill the defined vacancy in an organization. It determines the input quality of personnel and thus plays an important role in human resource management. The multi criteria nature and the presence of qualitative factors make it considerably more complex. This paper proposes a hybrid fuzzy MCDM model for personnel evaluation. It combines the fuzzy TOPSIS method with fuzzy worst-case (or entropy) method for linguistic reasoning under group decision making. Fuzzy worst-case and entropy methods are used to get weights of criteria, while fuzzy TOPSIS is utilized to rank the alternatives. The weights obtained from fuzzy worst-case and entropy methods are included in fuzzy TOPSIS computations and the alternatives are evaluated. The fuzzy MCDM for group decision making enables to aggregate subjective assessments of the decision-makers and thus offer an opportunity to perform more robust personnel evaluation procedures. To evaluate the alternatives the authors have formed an executive group consisting of five decision-makers. For evaluation the group has decided to consider five information culture criteria expressed in linguistic variables. A numerical example demonstrated the possibilities of application of the proposed method.*

## 1. INTRODUCTION

With the increasing competition in the global market, modern organizations face great challenges. The future survival of companies depends mainly on the contribution of their personnel to companies. Employee or personnel performances such as knowledge, capability, skill and other abilities play an important role in the success of an organization. Therefore, in order to remain a place in the market, it is necessary for companies to put more emphasis on personnel evaluation process (Karsak, 2001; Zhang & Liu, 2011). Personnel evaluation plays an important role in human resource management policy in any company which determines the input quality of personnel. Personnel evaluation is the process of choosing among the alternatives applying for a defined job in the company, the ones who have the qualifications required to perform the job in the best way (Dursun & Karsak, 2010; Balezentis, Balezentis, & Brauers, 2012; Balezentis, & Zeng, 2013).

Personnel evaluation is a complex process in the scope of which many factors should be evaluated simultaneously in the decision making process. Evaluation process should provide reliable and valid information about alternatives. There are some conventional techniques used in this process; mainly, completion of application forms, initial interview, employment test and background investigation. The conventional personnel evaluation techniques that are developed on the basis of static job characteristics will no longer suffice. These methods generally come to a conclusion on the basis of the subjective judgment of decision maker, which makes the accuracy of the results highly questionable. Moreover, these methods take into consideration some classical criteria (age, experience etc.) in the decision making process (Dagdeviren, 2010). Various studies have been conducted on personnel evaluation problem to eliminate the drawbacks of conventional personnel evaluation techniques (Chien & Chen, 2008; Karsak, 2001; Zhang & Liu, 2011; Dursun & Karsak, 2010; Wu, 2010). Chien & Chen (2008) reviewed the personnel evaluation studies and found that the important issues including change in organizations, change in work, change in personnel, change in the society, change of laws, and change in marketing have influenced personnel evaluation and recruiting. Personnel recruitment and evaluation directly affect the quality of employees (Chien & Chen, 2008). Hence, various new technologies, like computer-based testing, internet-based testing, telephone-based interviews, video-conference job interviews, and multimedia simulation tests, allow organizations to test large numbers of applicants at the same time and help saving time and money, and make better personnel evaluation decisions (Oostrom et al. 2013).

The ongoing processes of globalization as well as increasing competition require improving the personnel evaluation process. In recent years, with the rapid development of knowledge economics, the new types of industry have been gradually formed. The core content of this kind of industry includes knowledge, information, creativity, design and symbolic value, etc. In the knowledge economy era, the international competition becomes much fiercer than ever before. To be competent in the international trade stage, a country should not concentrate on the natural resources and the amount of money, but should pay attention on the quantity and quality of the talents who have creative ability and practical ability. All the countries should focus on the competition of the talent cultivation. Information is the major force to promote modern economic growth (Wu, 2010).

With the knowledge-based economy comes an increased awareness of the value of information and knowledge as unique, vital resources and factors of production (Bergeron et al. 2007). In the process of industrialization development together with information technology, the information personnel have become the “first resource”. They play a fundamental, strategic and decisive role. So, it is important to

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