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Decision making approaches for the strategic human resources selection problem: A Novel fuzzy approaches hybrid multi-criteria

Lamjed Souidi #1 and Younes Boujelbene #2 #
University of Economics and Management of Sfax, Tunisia Road Airport Km4 Sfax, Tunisia
1 lamjed44@hotmail.com
2 younes.boujelbene@gmail.com

Abstract:

The current complexity of human resource selection in private academia requires coordination between academics and professors to maximize efficiency and quality. In this area, our article presents an approach to evaluating and ranking human resources according to their skills. The problem is formulated as a multi-actor, multi-criteria decision-making problem and solved using novel approaches based on global agreement among decision-makers in a fuzzy environment. This research therefore aims to analyze human capital as one of the main factors of competitive differentiation between private universities.
This approach presents two stages of a consensus approach in that decision makers typically have conflicting preferences for a decision support problem. The first stage represents the determination of an overall agreement between decision-makers, while the second stage concerns the ranking of candidates for each task according to their skill levels.

Keywords: Evaluation, Classification, Competences, Preferences, 2-tuple, TOPSIS

1. Introduction

Increasingly, due to competitiveness and technological evolution, companies must invest in human capital to gain a competitive position, increasingly, due to technological advances and competitiveness; companies have to invest in their employees to gain a competitive advantage. With this, organizations seek to involve their employees by identifying, training, improving, and maximizing their skills to achieve the objectives required by the market. In this way, human capital management has become a key skill among an organization's managers and leaders to identify weaknesses, opportunities for improvement, interactions with other organizations, and improve operational techniques
Increasingly, due to competitiveness and technological change, companies must invest in human capital to gain a competitive position. . With this, organizations seek

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to integrate their employees into the various business processes by identifying, training, improving and maximizing their skills to achieve objectives and improve performance.
Several researchers (Arshinder & Deshmukh, 2008; Arshinder, Kanda and Deshmukh, 2011; Cardenas-Barrón, 2007; Piplani & Fu, 2005, etc.) became aware of the need to develop new approaches to human resource management
However, the problem of strategic choice, considered one of the main problems of CCS developed by practitioners addressed by Singh and Benyoucef (2013). The problem is formulated as a fuzzy MSMC
decision support problem and solved using neat and technical OWA fuzzy consensus based method for correspondence order performance with ideal
solution methodology (TOPSIS).
This article presents a new blurred hybrid approach for the problem of strategic selection of teachers in a private faculty. This approach is based on the possibility measurement in a fuzzy environment and the TOPSIS multicriteria method.

This document is organized as follows: the first part provides a brief review of the literature on strategic selection issues, consensus, group-based decision-making, fuzzy TOPSIS applications and objective programming applications. The second part describes the environment of the problem, the proposed approach and the results obtained.

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2.Consensus based group decision making

For most group decision making (GDM) problems, it is often necessary to develop a consensus process in an attempt to obtain a collective preference. Usually, consensus is defined as the full and unanimous agreement of all the stakeholders regarding all the possible solutions (alternatives). However, the chances for reaching such a full agreement are rather low and it allows the stakeholders to differentiate between only two states, namely, the existence and absence of consensus. Furthermore, complete agreement is not necessary always exists in real life. This has led to define and use a new concept of consensus degree, which is called ’’soft’’ consensus degree (Herrera, Herrera-Viedma, & verdegay, 1996; Kacprzyk & Fedrizzi, 1988).
In a soft consensus measure, the consensus process is defined as a dynamic and iterative stakeholders discussion process coordinated by a moderator who helps the

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stakeholders to make their opinions closer. In each step of this process, the moderator knows the actual level of consensus between the stakeholders by means of the consensus measure, which establishes the distance to the ideal state of consensus. Soft consensus measures are usually calculated by using only the opinions given by the stakeholders (Herrera et al., 1996; Kacprzyk & Fedrizzi, 1988; Zadrozny, 1997) or the choice degrees of alternatives obtained from those opinions (Bryson, 1996). In such case, a soft consensus measure is defined by measuring the coincidence or the distance between them calculated, e.g., by means of the Euclidean distance.

Liu and Zhang (2014) developed a consensus model for GDM with incomplete interval fuzzy preference relations using TOPSIS method. They, first defined a new consistency measure for incomplete interval fuzzy preference relations. Second, to estimate the missing interval preference values, they proposed a goal programming model guided by the consistency measure. Third, using the induced ordered weighted averaging operator (Yager & Filev,1999), an ideal interval fuzzy preference relation is constructed. Fourth, they defined a similarity degree between complete interval fuzzy preference relations and the ideal one. The similarity degree is related to the associated weights, and used to aggregate the DM's preference relations such that more importance is given to ones with the higher similarity degree. Finally, a new algorithm is presented to solve the GDM problem with incomplete interval fuzzy preference relations, which is further applied to partnership selection in formation of virtual enterprises.

In a discriminate way. Herrera-Viedma, Herrera, and Chiclana (2002) proposed a consensus model for MCDM with different preference structures, preference orderings, utility values, fuzzy preference relations, and multiplicative preference relations. The main improvement of this consensus model is that it presents a consensus support system to model the moderator's actions in the consensus reaching processes which guides the consensus process automatically. For our second approach, we adopt the Herrera-Viedma et al. (2002) model for consensus forming between the stakeholders without the interference of moderator.

3. Fuzzy consensus based on opportunity measure Approach to solving the problem

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This section presents the steps of our Opportunity Measurement and Assessment of Human Resource Competency Levels The assessment phase consists of in this consensus, decision makers have the opportunity to define the desired set of.With U represents the possibility transfer terminal.

The evaluation stages of our hybrid fuzzy approach combining consensus based :

Step 1. Select all quantifiers and retrieve the fuzzy preferences of the decision maker si.

Step 2. For each skill resource, calculate Pj and U using the equations Step 2. For each skill resource, calculate Gjs, Pi and U using the equations : $Pj = Min \{1\text{-}Gi + \sum(Gi)^2\}$; U = 1- Pj .

Step 3.. For each skill resource, select Djs [0, U] and calculate Tj.

Step 4. Apply the α-coupe and the optimal index . a to obtain the clear preference.

Step 5. Calculate the Hi compliance measure for each decision maker to aggregate all assessments using the following equations:

Step 6. For each competency resource and candidate, select the decision maker's preference with the lowest Hi value.

Based on the TOPSIS technique and the assessments of decision-makers, we classified the resources according to competencies according to the following steps:

Step 1. Determine weight of skills resources

Step 2. Indicate language scales for each vague collective preference

Step3. Construct the weighted fuzzy matrix of collective preferences using equations.

Step 4. Identify ideal and anti-ideal alternatives.

Step 5. Determine the proximity coefficient cci .

Step.6. Rank alternatives in descending order and select the best ranked Ai alternative.

4. Classification of candidates

Decision Making and Interpretation

Applying the TOPSIS method and the results found in the preceding table, it is interesting to calculate the coefficient of proximity according to the following expression:

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$$CC_{ij} = \frac{d_{ij}^{-}}{d_{ij+d_{ij}^{-}}^{+}} \forall \quad i=\{1,2,..n\} \quad \text{and} \quad j=\{1,2 \ldots .m\}$$

The ranking of the candidates for each task is determined in descending order of the different values of the coefficientCC_{ij}.

The following table represents the ranking of candidates for each module.

Table 1: Ranking of Candidates

CC_{ij}	*C1*	*C2*	*C3*	*Ranking*
T1 (M1)	0.81	0.6	0.19	C1>C2>C3
T2 (M2)	0.75	0.41	0.45	C1>C3>C2
T3 (M3)	0.17	0.83	0.4	C2>C3>C1
T4 (M4)	0.17	0.5	0.69	C3>C2> $C1$

Based on these results, the majority of candidates classified by Approach 2 based on the consensus of different decision makers and the TOPSIS method are characterized by higher proximity coefficients for different tasks compared to candidates classified by the first approach based on method 2- tuples and the TOPSIS method

Tasks T1 and T2 must be taken in charge by candidate C1, he recorded levels for knowledge, know-how and know-how that were close to those required for task T1, so for task T2 , it has recorded high levels for knowledge and know-how.

As far as task T3 is concerned, it must be taken over by candidate C2, it has recorded important levels for knowledge. Thus the C2 candidate recorded high levels as those of the C1 candidate for some resources however these ressources étaient les moins importantes pour traduire un coefficient de proximité plus élevé.

For the C3 candidate, this candidate can only be assigned to the T4 task, he recorded higher levels than the C1 and C2 candidates and which were close to those required.

Indeed, this method of evaluating and ranking resources according to skills is based on a global agreement between decision-makers (consensus) and the TOPSIS method in a fuzzy environment. We have noted that this approach targets different essential aspects of decision-making support, namely:

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-An interactive aspect allowing the group of decision-makers to exchange, evolve and learn through their own preferences and judgments.

-An articulation of the preferences of decision-makers a priori (TOPSIS).

-Modeling fuzzy preferences tainted with ambiguity using fuzzy number theory.

Conclusion

The work presented in this article has allowed us to propose contributions in several organizational processes, including the process of assessing and ranking human resources according to competencies. Indeed, we proposed a decision support method for the management of this process based on a consensus based on the measurement of possibility in a fuzzy environment and the TOPSIS multi-criteria method.

We found that consensus based on the measurement of opportunity retained the assessments of the majority of decision makers, resulting in better results. Indeed, the proximity coefficients obtained by the TOPSIS multicriteria evaluation method are higher, which allows a better correspondence between the skills acquired by the candidates and required by the tasks.

In the future, we expect to use an approach based on a hybridization of the two methods to achieve a new consensus with an interactive aspect while respecting stakeholder preferences (measure of consensus opportunity). This new consensus will be used with multi-objective programming with the satisfaction function (gpsf) to have an alternative that meets the needs of stakeholders. In addition, in order to more flexibility for stakeholders, we plan to use different types of data (blurry, clear, intervals, etc.) and test several examples problem of supplier selection, problem of technology selection, plant location selection problem, information systems selection.

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