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Article An Innovative Job Evaluation Approach Using the VIKOR Algorithm

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Abstract: Fairness is a key issue that requires the attention of human resource management practitioners. Having a robust methodical procedure for identifying the value of job positions in an enterprise is essential. Consequently, there is a need for a job evaluation system that ensures fair compensation for each position. A poorly defined job evaluation system creates the dilemma of mismatches between employees and their competencies for their responsibilities and, accordingly, their wages. This results in employee dissatisfaction, which ultimately exacerbates attrition, which is costly because of the loss of talented employees. This paper proposes a VIKOR algorithm as an innovative approach to job evaluations. Engineering-related positions in an international aviation company were analyzed to illustrate the appropriateness of the proposed approach for managing the job evaluation dilemma. The results indicate that 29 job grades would be appropriate for this firm. In addition, the proposed algorithm was found to be superior to other multiple-criteria decision-making techniques at managing the job evaluation dilemma.

Keywords: job evaluation; VIKOR; human resources management; multiple-criteria decision making

1. Introduction

The feeling of fairness enhances employee morale, which can be reflected in improved organizational performance. It is clear that such feelings engender trust. Fairness, a key issue that should not be ignored in human resource management (HRM), has been defined as the ability to manage human resources with justice and honesty and without prejudice or bias (Lawson 2011). Therefore, "fairness is not an attitude ... it's a professional skill that must be developed and exercised" (Hume n.d.). Having a robust reward distribution system implies a fairness-based workplace environment (Datta 2012; Ostroff 1992; Balkin 1992; Miller 2001; Robbins 2016; Zhang et al. 2015). Consequently, having a fair reward mechanism in the employee promotion policies, along with a fair job evaluation (JE) system, is necessary (Koziol and Mikos 2019; Bosch 2015). Furthermore, JEs are seen as a methodical procedure for identifying the relative value of jobs in the enterprise to ensure fair compensation for each position (Armstrong and Taylor 2020).

JE appears to be simple; however, it is a sophisticated concept because of the subjectivity and complexity in job descriptions and analyses (Das and Garcia-Diaz 2001). The classic approaches to JEs have been implemented in various ways (i.e., quantitative and qualitative approaches) (Corominas et al. 2008). However, these approaches ignore the complexities in implementing JEs (Kahya 2006b). Multiple-criteria decision-making (MCDM) applications illustrate the practicality of adding sophisticated decision-making tools and techniques as an analytical dimension (Kahya 2006b; Kutlu et al. 2013, 2014). However, the practical integration of these tools to manage the complexity of such sophisticated processes has not been fully realized. The JE, a cornerstone of HRM, is a critical industrial relations issue; however, few studies have addressed it. To address this gap, this paper proposes the use of VIKOR (VlseKriterijuska Optimizacija I Komoromisno Resenje), an MCDM tool, as an innovative approach to JEs. Engineering-related positions in an international aviation



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Copyright: © 2021 by the author. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https:// creativecommons.org/licenses/by/ 4.0/). company were analyzed to demonstrate the effectiveness of the proposed approach for managing the JE dilemma.

2. Background and Relevant Literature

2.1. Background

The many JE methods have been divided into two traditional categories: qualitative and quantitative JEs. These categories are also commonly known as non-analytical and analytical JEs, respectively (Koziol and Mikos 2019). The following four methods can be considered the most commonly known and used: ranking, grading, point factor rating, and factor comparison. The latter two are quantitative, and the former two are qualitative (Dubey 2015). The qualitative methods are older, while the quantitative methods are relatively more modern. These methods have been implemented under different names in various industries. Examples are Bedaux's method, the Hay Guide Chart–Profile method, the Scheme of Geneva, the universal method, the National Joint Council, the JE questionnaire, and market-based JE (Adamus 2009).

The point factor method is the most used technique, and it is likely the most commonly accepted approach for analytical JEs (Armstrong and Taylor 2020) because of its simplicity and applicability (Kahya 2006b). Indeed, the point factor method has been widely applied because of its accuracy and the reliability of the outcomes (Bass and Barrett 1981; Das and Garcia-Diaz 2001). It can be considered an objective approach to the quantitative evaluation and analysis of jobs by rating several related factors in accordance with predetermined target measures (Dubey 2015). According to Armstrong and Taylor (2020), the value of a job, also known as job size, is represented by the contribution of each factor. Points are assigned to each factor, and their summation represents the worth of a specific job (i.e., its value or size) (Dubey 2015). The assigned points are based on the identified level of complexity for each job criterion (Adamus 2009). Specifically, each job is broken down into a set of elements or factors that reflect the workloads, required capabilities and competencies, and contributions of each factor.

When the point factor is applied, the weights of the selected factors can be generated by either the subjective judgments of the evaluation committee members or the application of models using optimization and/or statistical techniques (Kahya 2006b). The generation of weighted criteria using such models facilitates a firm's creation of value-based job priorities (Kahya 2018). Having a set of weighted factors can also facilitate the job-pricing process (Weinberger 1995).

2.2. Relevant Literature

JEs have received little attention in the HRM literature; nevertheless, they have always been an attractive topic in mathematical modeling. For example, Ahmed (1989) discussed the importance of the JE process, especially in terms of factor weight allocation; thus, an effective linear programming model has been developed. To enhance objectivity, Gupta and Ahmed (1988) demonstrated an application of a linear-based goalprogramming model to generate factor weights more precisely; however, the pre-emptive levels (goals) in their model were identified subjectively. This could lead to the generation of a mismatched weight for each level (Kahya 2018). Moreover, in LP/GP models, any increase in the number of factors for a set of jobs can increase the number of constraints (Kutlu et al. 2013). Das and Garcia-Diaz (2001) aimed to add reliability by developing a statistical JE model focused on determining the most appropriate evaluation factors. They used basic statistical analysis and linear correlation coefficients to more objectively quantify the value of the selected factors and jobs. Pittel (1999) developed a multiple regressionbased model to generate updated factor weights on the basis of the market weight for each job. A mathematics-based point rating model has been developed to identify the most appropriate performance-based salary levels (Kareem et al. 2011).

The JE dilemma has often been considered an MCDM problem. Gupta and Chakraborty (1998) suggested that JE could be considered a managerial decision issue: specifically, an

MCDM problem. Thus, they have developed a mathematical fuzzy-based MCDM model to address and to solve this issue objectively. In the same way, a JE system for 96 blue-collar jobs was developed through the use of questionnaires and interviews with Turkish metal industry executives. The focus was job factors and their corresponding weighting and levels (Kahya 2006a). The same context was also investigated through the analytic hierarchy process (AHP) (Kahya 2006b). The fuzzy analytic hierarchy process (F-AHP) was used, and the job scores were obtained through the Fuzzy Technique for Order Preference by Similarity to Ideal Solution (F-TOPSIS) (Kutlu et al. 2013). A similar approach was taken in another study (Kutlu et al. 2014). Yu and Tang (2011) aimed to improve the application of the point factor method by developing 12 operational steps for the JE procedure. This approach was enhanced by the use of statistical analysis applications and a modified AHP model. Practical compensation factors for JEs have been analytically identified within a hierarchical structure by using the interval analytic hierarchy process (IAHP), which considers the point-factor assumption (Chen and Jiang 2011). With the participation of 40 HRM professionals, the significance and influence of key JE factors and sub-factors were examined through the AHP (Doğan et al. 2014). An in-depth AHP was conducted, and statistical techniques were applied to enhance the applicability of the point factor as a JE method (Sun and Luo 2013).

3. VIKOR Algorithm

VIKOR has recently been applied and accepted academically as an authentic technique for solving MCDM problems. VIKOR applications have been used to address multifactorial problems in several research areas and industries (Mardani et al. 2016), such as manufacturing (Chatterjee et al. 2010; Devi 2011; Parameshwaran et al. 2015; Ghorabaee 2016), materiality assessment (Caliskan 2013; Yazdani and Payam 2015), construction engineering and management (Peng 2015; Pamučar and Čirović 2015; Tošić et al. 2015; Vahdani et al. 2013), sustainability (Quijano Hurtado et al. 2012; Martin-Utrillas et al. 2015), finance (Liu et al. 2016; Shen and Tzeng 2015; Safari et al. 2016), marketing (Chang et al. 2015), performance evaluation (Kuo and Liang 2012; Hsu 2015; Lee and Pai 2015), and HRM (Liu and Wu 2012; Mohammadi et al. 2014; Chou et al. 2014). For example, HR managers' competencies have been measured by using VIKOR as a proposal for an effective and practical evaluation approach (Liu and Wu 2012). A project manager selection model was developed by incorporating the cybernetic analytic network process (CANP) and the quality function deployment (QFD), which were validated with the VIKOR method (Mohammadi et al. 2014). The performance of women in science and technology as intellectual HRs in 25 countries was evaluated with VIKOR (Chou et al. 2014).

The root of the VIKOR method is known as the $L_{p,i}$ metric, which can be defined as follows (Opricovic 1998; Opricovic and Tzeng 2004; Shojaei et al. 2018; El-Santawy 2012; Tzeng et al. 2005):

$$L_{p,i} = \left\{ \sum_{j=1}^{n} \left[u_j \left(\widetilde{v}_j^+ - \widetilde{v}_{ij} \right) / \left(\widetilde{v}_j^+ - \widetilde{v}_j^- \right) \right]^p \right\}^{\frac{1}{p}}, \qquad (1)$$
$$1 \le p \le \infty$$

where u_j is the weight of criterion j; \tilde{v}_j^+ and \tilde{v}_j^- represent the best and worst values within criterion j, respectively; and \tilde{v}_{ij} is the value corresponding to alternative i with respect to criterion j. The value of p represents the tendency of the metric L_p in that when = 1, $L_{1,i}$ represents the extreme tendency for the maximum group utility. However, when $= \infty$, $L_{\infty,i}$ represents the extreme tendency for the minimum regret (Shojaei et al. 2018; El-Santawy 2012; Tong et al. 2007; Yu 1973). Accordingly, VIKOR can be expressed in the form of a matrix in which the columns represent the criteria and the rows represent the alternatives. According to several applications in the literature (Opricovic and Tzeng 2004; Shojaei et al. 2018; El-Santawy 2012; Acuña-Soto et al. 2019; Huang et al. 2009), the VIKOR steps for

solving an MCDM problem of m alternatives, $(x_1, x_2, x_3, ..., x_m)$, with respect to n criteria, $(y_1, y_2, y_3, ..., y_n)$, can be set as follows:

Step 1. Develop a decision matrix $\tilde{D} = (\tilde{d}_{ij})_{m \times n}$ where *m* represents the number of alternatives and *n* represents the number of criteria; \tilde{d}_{ij} is a real number that represents the value of the alternative x_i with respect to the criterion y_i :

$$\widetilde{D} = \begin{array}{c} y_1 & y_j & y_n \\ x_1 & \left[\begin{array}{cc} \widetilde{d}_{11} & \widetilde{d}_{1j} & \widetilde{d}_{1n} \\ \vdots & \vdots & \vdots \\ \widetilde{d}_{m1} & \widetilde{d}_{mj} & \widetilde{d}_{mn} \end{array} \right].$$

$$(2)$$

Step 2. Construct the normalized decision matrix $\tilde{N} = (\tilde{n}_{ij})_{m \times n}$ in which \tilde{n}_{ij} is calculated as follows:

$$\widetilde{n}_{ij} = \frac{a_{ij}}{\sqrt{\Sigma d_{ij}^2}} \text{ where } i = 1, \dots, m;$$
for each $j: j = 1, \dots, n.$
(3)

Step 3. Determine the weight corresponding to each criterion j, $u_j \in [0, 1]$:

$$u_1, +u_2 + \ldots + u_j = 1.$$
 (4)

Step 4. Develop the weighted normalized decision matrix $\tilde{C} = (\tilde{c}_{ij})_{m \times n}$ in which \tilde{c}_{ij} is calculated as follows:

$$\widetilde{c}_{ij} = u_j \times \widetilde{n}_{ij}.$$
(5)

Step 5. Find the positive ideal and negative solutions as follows:

$$K^{+} = \left\{ \tilde{c}_{1}^{+}, \dots, \tilde{c}_{n}^{+} \right\} Positive ideal solution$$
(6)

$$K^{-} = \left\{ \widetilde{c}_{1}^{-}, \dots, \widetilde{c}_{n}^{-} \right\} Negative ideal \ solution \tag{7}$$

where

$$\widetilde{c}_{i}^{+} = \left\{ \max\left(\widetilde{c}_{ij}\right) if j \in \widetilde{J}; \min\left(\widetilde{c}_{ij}\right) if j \in \widetilde{J} \right\},$$

$$j = 1, \dots, n$$
(8)

$$\widetilde{c}_{i}^{-} = \left\{ \min\left(\widetilde{c}_{ij}\right) if j \in \widetilde{J}; \max\left(\widetilde{c}_{ij}\right) if j \in \widetilde{J} \right\},$$

$$j = 1, \dots, n$$
(9)

J represents the set of benefit critria

¨J represents the set of cost critria.

Step 6. Find \hat{S}_i and \hat{R}_i where:

$$\hat{S}_i = \sum_{j=1}^n \left(\tilde{c}_j^+ - \tilde{c}_{ij} \right); \ i = 1, \dots, m$$
 (10)

$$\hat{R}_i = max_i \left(\tilde{c}_j^+ - \tilde{c}_{ij} \right); \ i = 1, \dots, m.$$
(11)

Step 7. Calculate the ranking indexes (\hat{Q}_i) as follows:

$$\hat{Q}_{i} = \ddot{\lambda} \left[\frac{(\hat{S}_{i} - \hat{S}^{-})}{(\hat{S}^{+} - \hat{S}^{-})} \right] + \left(1 - \ddot{\lambda} \right) \left[\frac{(\hat{R}_{i} - \hat{R}^{-})}{(\hat{R}^{+} - \hat{R}^{-})} \right]$$
(12)

where $\hat{S}^+ = max_i \hat{S}_i$; $\hat{R}^+ = max_i \hat{R}_i$;

 $\ddot{\lambda} \in [0, 1]$ is the weight for the strategy of maximum group utility (majority rule), and $(1 - \ddot{\lambda})$ is the weight of the "regret". Then, alternatives are sorted in descending order according to the \hat{S}_i , \hat{R}_i , and \hat{Q}_i values. \hat{S}_i sorts the alternatives with respect to the maximum group utility (majority rule), and $\ddot{\lambda} > 0.5$ should be used as a decisionmaking strategy. In contrast, \hat{R}_i sorts the alternatives with respect to the minimum "regret"; $\ddot{\lambda} < 0.5$ should be used for this strategy. Usually, $\ddot{\lambda} = 0.5$ is employed as a reflection of the "consensus" strategy. The best alternative, x_1 , has the minimum \hat{Q}_i value, and the second best, x_2 , has the second lowest value of \hat{Q}_i , and so on. The x_1 alternative is considered a compromise if the following two conditions have been met:

• Condition (Condit.) 1: Acceptable advantage:

$$Q(x_2) - Q(x_1) \ge DQ$$

where DQ = 1/(m - 1), *m* represents the total number of alternatives.

- Condit. 2: Acceptable stability in decision-making: The *x*₁ alternative must also be ranked best by \hat{S}_i and/or \hat{R}_i . If one of these conditions is not met, a set of compromise solutions is considered:
- Alternatives *x*₁ and *x*₂ represent the compromise solutions if only the "acceptable stability in decision-making" condition is not met, or
- Alternatives $x_1, x_2, ..., x_M$ represent the compromise solutions if the "acceptable advantage" condition is not met; x_M is identified by the relationship $Q(x_M) Q(x_1) < DQ$, for maximum x_i .

It is worth noting that almost all VIKOR applications employ other MCDM tools, specifically, the AHP (Mardani et al. 2016; Rezaie et al. 2014; Wu et al. 2012; Chen and Chen 2010; Tsai and Chang 2013; Dincer and Hacioglu 2013). Thus, AHP is usually executed to generate the criteria weighting in MCDM models (Step 3, as illustrated above in the VIKOR steps). Indeed, AHP is a well-known MCDM tool that has been widely used to solve industrial issues. It was developed by Saaty (1977, 1987) to address the MCDM problem through mathematical operations and matrices to generate the weighting for the criteria and/or alternatives. In AHP, all the criteria and/or alternatives are involved in the pairwise comparisons using Saaty's 1–9 scale of measurement. The general steps in the AHP, including Saaty's scale, are summarized in Table 1. Further details regarding the computations of the consistency ratio in the AHP can be found in (Al-Harbi 2001).

Table 1. AHP steps.

Step 1:List the goal, criteria, sub-criteria, and decision alternatives.Step 2:Develop a pair-wise comparison matrix (size $n \times n$) for each set of criteria, sub-criteria,
or alternatives to be compared by using Saaty's 1–9 scale of measurement.Step 3:Develop a normalized matrix for each comparison by dividing each number in a column
of the pairwise comparison matrix by its column sum.Step 4:Develop the priority vector by averaging each row of the normalized matrix for each set
of comparisons. Each element (criterion, sub-criterion, or alternative) will have a score.Step 5:Calculate the overall priority (weights) by multiplying the criteria scores with respect to
their corresponding goal (or by multiplying the sub-criteria scores with respect to their
corresponding criterion or sub-criterion).Step 6:Calculate consistency ratio (CR) = consistency index CI/random index (RI), where
CI = $(\lambda_{max} - n)/(n - 1)$; RI = 0.58, 0.90, 1.12, 1.24, 1.32, and 1.41 when n = 3, 4, 5, 6, 7, and 8,
respectively; n is the size of the matrix (number of criteria or alternatives).

4. Application

The proposed VIKOR approach to JEs was applied to a leading international aviation company that provided engineering and maintenance services at more than 50 local and international airports. A group of experts representing 16 different departments (MD Office (MDO), Aircraft Maintenance (AM), Aircraft Component Maintenance (ACM), Supply Chain (SC), Power Plant Maintenance (PPM), Technical Training (TT), Technical Contract (TC), Information Technology (IT), Plants & Equipment Maintenance (PEM), Engineering (E), Safety & Technical Quality Assurance (STQA), Maintenance Control Center (MCC), Human Resources (HR), Finance (F), Technical Sales & Marketing (SM), and Administration (ADM)) were carefully selected. All experts were (1) skillful, professional, and well-educated; (2) occupying critical managerial or HRM positions; and (3) capable of dealing with different technical and managerial aviation issues. Expert opinions were used to rate the (1) JE criteria and (2) job position (JP) against each criterion. Saaty's 1–9 scale of measurement was employed to perform the AHP pairwise comparisons to extract the weight for eight JE criteria: (C1) technical aviation knowledge, (C2) managerial knowledge, (C3) education, (C4) professional development level, (C5) work experience, (C6) communication skills, (C7) job responsibility, and (C8) decision-making skills. AHP was applied to facilitate the execution of Step 4 in the VIKOR algorithm. Thus, experts used linguistic terms to rate the importance of each JP with respect to each JE criterion (Table 2; Conducting Step 1 in VIKOR). Expert involvement in this brainstorming exercise occurred during consecutive meetings to seek consensus in the AHP pairwise comparison and VIKOR Step 1 matrices. As a result of the large number of JPs to be compared and the complexity of the evaluation process, these consecutive meetings were held over a one-year time horizon. Figure 1 shows the weight extraction process for each criterion in the AHP. Figure 2 illustrates the process of using linguistic terms to rate each JP on the basis of each JE criterion.

It is worth noting that job evaluation criteria (also known as factors) are conventionally classified into four main categories: skills, responsibilities, efforts, and working conditions (Kahya 2006b). Usually, these criteria incorporate several sub-criteria from which companies select a customized set of criteria that suits their industry. Thus, a set of criteria (extracted from the literature) was presented to the experts in order to compare these criteria with the eight existing criteria that are being used in the company. The purpose of such an exercise is to explore to what extent a company's criteria are aligned with those that are commonly accepted in literature. Just a few slight, trivial, and typographical changes have been corrected, which indicates that the company's existing criteria are aligned with the literature, and accordingly, confirmed for the purpose of this study.

	C1	C2	C3	C4	C5	C6	C7	C8				
C1	1.00	1.00	0.25	3.00	0.50	2.00	0.33	2.00				
C2	1.00	1.00	0.25	3.00	0.50	2.00	0.33	2.00				
C3	4.00	4.00	1.00	6.00	3.00	5.00	2.00	5.00				
C4	0.33	0.33	0.17	1.00	0.25	0.50	0.20	0.50				
C5	2.00	2.00	0.33	4.00	1.00	3.00	0.50	3.00				
C6	0.50	0.50	0.20	2.00	0.33	1.00	0.25	1.00				
C7	3.00	3.00	0.50	5.00	2.00	4.00	1.00	4.00				
C8	0.50	0.50	0.20	2.00	0.33	1.00	0.25	1.00				
After Conducting All AHP Steps												
			Final W	eight of	f Each C	riterion	1	I				
	C1	C2	C3	C4	C5	C6	C7	C8				
	0.09	0.09	0.32	0.04	0.14	0.05	0.22	0.05				

Figure 1. Final weight of each criterion in the analytic hierarchy process.

Additionally, it is very important herein to note that according to Yin (2017), case studies can be generalized analytically either using the replication logic when the research design incorporates two or more case studies; or by employing the approach of theory development when the research is designed based on a single case study as presented herein and as conducted previously in various MCDM research attempts (Siachou and Vlachos 2017; Narayanamurthy et al. 2018), including VIKOR applications (Luthra et al. 2017). Yin stressed that a case study should be considered as an "opportunity to shed empirical light on some theoretical concepts or principles ... that is, analytic generalization", and such a research design is relatively being considered as a unique form of validation, as it is entirely different from the classical statistical generalization. The constructive research approach belongs to the interventionist research paradigm (Morris et al. 2018), which is also known as a development research paradigm (De Villiers 2012). Dumay and Baard (2017) define interventionist research as a case study-based research approach through which researchers and practitioners (managers in organizations) work together in order to design and implement solutions in an interventional approach for the purpose of solving real-life issues. In turn, the constructive research approach aims at solving real-world issues through innovative employment of step-by-step practical procedures (i.e., constructions such as mathematical algorithms) in order to develop a kind of theoretical contribution corresponding to a certain field of knowledge (Lukka 2003). Indeed, under the umbrella of a constructive research approach, several research works have been conducted in order to develop empirical applications corresponding to the theory of MCDM (Antinmaa 2012; Morris et al. 2018; Lin et al. 2020; Tsolas 2020).

Department	Job ID #	Job Category	Job Title (i.e. Job Position)	C1	C2	C3 C4 C5	C6 C7	C8	Department	Job ID #	Job Category	Job Title (i.e. Job Position)	C1 C2 C3 C4 C5 C6 C7 C8
MD Office		CEO	Chief Executive Officer (CEO)	OR	CR	BH SD >10	L EC	EC	TT	J62	Director	Technical Training Director	R/CR R BH AM 8-10 G/L OC/C C
AM	J2 T2	VP	Aircraft Maintenance Vice President	OR	R/CR	BH SD >10	L C/EC	C/EC	TT	J63	Manager	Aircraft Technology & Maintenance Training Manager	R/CR OR/R B M 6-8 S/G OC OC/C
AM	15	Director	Aircraft Maintenance Director	D	R D	BH AM 8-10		-	11 TC	164	Director	Human Factors & Regulation Training Manager	CP P PH AM 8 10 C/L C C
AM	15	Director	Aircraft Intarior Maintenance Director (Editerin Stations)	P	D	BH AM 8-10		C	TC	166	Monagar	Sumha Salas Managar	
AM	16	Director	Aircraft Production Planning Director	R	R	BH AM 8-10	G/LC	č	TC	167	Manager	Technical Contracts Manager	OB/B OB/B B M 6-8 S/G OC OC/C
AM	17	Director	Aircraft Maintenance Director (Western Stations)	R	R	BH AM 8-10	G/L C	c	IT	J68	Manager	Project Manager	RR OR/R B M 6-8 S/G RC/OC OC/C
AM	JS	Director	Aircraft Technical Inspection Director	R	R	BH AM 8-10	G/L C	C	IT	J69	Manager	Performance Management & PMO Manager	NR RR/OR B AD < 2 S RC RC
AM	J9	Manager	Aircraft Maintenance Manager	R	OR/R	B M 6-8	S/G OC/C	COC/C	IT	J70	Manager	Information Technology Manager	NR RR/OR B AD < 2 S RC RC
AM	J10	Manager	Aircraft Maintenance Region Manager	OR/R	OR	B M 6-8	S/G OC	OC/C	IT	J71	Specialist	Senior System Support Analyst	NR RR/OR B AD < 2 S RC RC
AM	J11	Section Manager	Aircraft Maintenance Section Manager	OR/R	OR	B M 6-8	S/G OC	OC/C	IT	J72	Specialist	Network Specialist	NR RR/OR B AD < 2 S RC RC
AM	J12	Shift Manager	Aircraft Maintenance Shift Manager	OR/R	OR/R	B M 6-8	S/G OC	OC/C	IT	J73	Specialist	Systems Support Analyst	RR OR/R B M 6-8 G RC/OC OC/C
AM	J13	Senior Specialist	Senior Specialist- Aircraft Maintenance	OR	OR	B AD 4-6	S/G RC/O	C RC/OC	IT	J74	Specialist	Data Processing Assistant	RR OR/R B M 6-8 S/G RC/OC OC/C
AM	J14	Specialist	Specialist- Aircraft Maintenance	RR/OF	RR/OR	B AD < 2	S RC	RC	PEM	J75	Director	Plants & Equipment Maintenance Director	OR/R R BH AM 8-10 G/L C C
AM	J15	Specialist	Specialist- Materials Demand Planning & Analysis	RR/OF	RR/OR	B AD 4-6	S RC	RC	PEM	J76	Manager	Equipment Maintenance Manager	OR OR/R B M 6-8 S\G RC/OC OC/C
AM	J16	Specialist	Specialist- Aircraft Production Planning	RR/OF	RR/OR	B AD <2	S RC	RC	PEM	J77	Manager	Plants Equipment Engineering & Planning Manager	OR OR/R B M 6-8 S\G RC/OC OC/C
AM	J1/	Supervisor	Aircraft Maintenance Senior Supervisor	CR	RK DD	D AD <2	S NC/R		PEM	378	Manager	Plants Maintenance Manager	RR/OR OR B M 6-8 S\G RC/OC OC/C
AM	110	Supervisor	Aircraft Maintenance Supervisor	CR	OP	D M 4.6	S PC/O		PEM	1/9	Manager Section Manager	Diaming Section Manager	
434	120	Technician	Aircraft Maintenance Tachnician	CP	OR	D M 4-6	S PC/O		DEM	191	Section Manager	Planting Securit Maintenance Section Manager	
ACM	121	VP	Aircraft Component Maintenance Vice President	OR	R/CR	BH SD >10	L C/EC	C/EC	PEM	182	Supervisor	Plants & Equipment Maintenance Supervisor	OB OB D M 4-6 S BC OC
ACM	J22	Director	Component Production Engineering & Planning Director	R	R	BH AM 8-10	G/L C	C	PEM	J83	Technician	Ground Support Equipment Technician	CR RR D AD < 2 S RC RC/OC
ACM	J23	Director	Component Maintenance Director	R	R	BH AM 8-10	G/L C	C	PEM	J84	Technician	Facility Plant Technician	CR RR D AD < 2 S RC RC/OC
ACM	J24	Manager	Component Maintenance Manager	R	OR/R	B M 6-8	S/G OC/C	COC/C	PEM	J85	Technician	Facility & Equipment Maintenance Technician	CR RR D AD 4-6 S RC/OC RC/OC
ACM	J25	Section Manager	Component Maintenance Section Manager	OR/R	OR	B M 6-8	S/G OC	OC/C	PEM	J86	Technician	Ground Support Equipment Technician	CR RR D AD 4-6 S RC/OC RC/OC
ACM	126	Senior Specialist	Component Maintenance Senior Specialist	OP	0.0	B AD 46	SIG PCIO	C PC/OC	F	187	Director	Aircraft Engineering Director	P P PH AM 9 10 C/L C/EC C
ACM	107	Casalalist	Composed Maintenance Securities	DR/OF	00	0 40 40	3/0 RC/0		E E	100	Massau	Alexand Conferentian Manager	
ACIM	327	specialist	Component Maintenance Specialist	RR/OF	RR/OR	B AD < Z	S RC	RC	E	388	wanager	All crait Conlight abon Manager	R OR/R B M 6-8 G OC/C OC/C
ACM	J28	Specialist	Component Capacity Planning & Analysis Specialist	RR/OF	RR/OR	B AD < 2	S RC	RC	E	J89	Manager	Technical Data & Publications Manager	R OR/R B M 6-8 G OC/C OC/C
ACM	J29	Supervisor	Aircraft Component Maintenance Supervisor	CR	OR	D M 4-6	S RC/O	CRC	E	J90	Manager	Maintenance Program Manager	R OR/R B M 6-8 G OC/C OC/C
ACM	J30	Technician	Aircraft Component Technician	CR	RR	D AD 2-4	S RC	RC/OC	E	J91	Manager	Aircraft Engineering Support Manager	R OR/R B M 6-8 G OC/C OC/C
ACM	131	Technician	Aircraft Component Support Technician	OP	DD		S NC/P	C PC/OC	F	192	Senior Specialist	Aircraft Engineering Senior Specialist	
SC.	120	AUD	A sister Via and dat for Support Petinican	OR (D	0			C RC/OC	E	102	Canada lint	Alexand Engineering Considerat	
SC	332	AVP	Assistant vice president for Supply Chain Management	UK/K	к	BH SU 8-10		C	1	195	specialist	Aircrait Engineering Specialist	RR RR/UR B AD < 2 S RC RC
SC	J33	Director	Warehousing and Logistics Director	OR	R	BH AM 8-10	LC	C	STQA	J94	Director	Safety and Technical Quality Assurance Director	OR R BH AM 8-10 G/L C C
SC	J34	Director	Inventory Management & Purchasing Director	OR	OR/R	B M 6-8	SG OC	OC/C	STQA	J95	Manager	Quality Assurance Manager	OR/R OR/R B M 6-8 S/G OC OC/C
SC	J35	Manager	Warehousing and Logistics Manager	OR	OR/R	B M 6-8	SG OC	oc/c	STQA	J96	Senior Specialist	Quality Assurance Senior Specialist	RR OR B AD 4-6 S/G RC RC/OC
SC	J36	Manager	Customs Receiving Manager	NR/RE	RR/OR	B AD <2	S BC	BC	STOA	197	Specialist	Quality Assurance Specialist	RR BR/OR B AD < 2 S BC BC
80	127	Manager	Investory Mercery	00	0	0 10 -2	C/L C	0	MCC	100	Director	Meintennen Control Director	
SC	357	wanager	inventory ivialiager	UK	к	BH AM 8-10	G/L C	C	MCC	196	Director	Maintenance Control Director	R R BH AM 8-10 G/L C C
SC	J38	Manager	Purchasing Manager	OR	OR/R	B M 6-8	S/G OC	OC/C	MCC	J99	Manager	Maintenance Control Manager	OR/R OR/R B M 6-8 G/L OC OC/C
SC	J39	Manager	Strategic Sourcing Manager	OR	OR/R	B M 6-8	S/G OC	OC/C	MCC	J100	Senior Specialist	Maintenance Control Senior Specialist	RR/OR OR B AD 4-6 S/G RC/OC RC/OC
SC	J40	Section Manager	Inventory Section Manager	OR	OR/R	B M 6-8	S/G OC	OC/C	MCC	J101	Specialist	Maintenance Control Specialist	RR/OR RR/OR B AD < 2 S RC RC
SC	J41	Section Manager	Purchasing Section Manager	OR	OR	B M 6-8	S/G RC/O	c oc/c	HR	J102	Director	Human Resources Director	OR R BH AM 8-10 G/L C C
sc	142	Senior Specialist	Programment Senior Specialist	OR	0.0	0 14 6 9	SIC DCIO	C OC/C	LID	1103	Manager	Human Pacouroas Stratagy & Diaming Managar	
50	140	C	Proceeding of Specialist	OR	ON ISS	0 10 0-0	3/6 NC/0		III	7105	Manager	D 1 D C M	
SC	J45	Specialist	Strategic Sourcing Specialist	RR	RR/OR	B AD < 2	S RC	RC	HK	5104	Manager	Development and Performance Manager	OR OR/R B M 6-8 S/G OC OC/C
SC	J44	Specialist	Procurement Specialist	RR	OR	B AD 4-6	S/G RC/O	C RC/OC	HR	J105	Manager	Assessment and Selection Manager	OR OR/R B M 6-8 S/G OC OC/C
SC	J45	Specialist	Warehouses Services Specialist	RR	RR/OR	B AD <2	S/G RC	RC	HR	J106	Manager	Recruitment and Administration Support Manager	RR OR/R B M 6-8 S/G RC/OC OC/C
PPM	J46	VP	Power Plant Maintenance Vice President	OR	R/CR	BH SD >10	L C/EC	C/EC	HR	J107	Manager	Employee Relations. Services and Compensation Manager	RR OR/R B M 6-8 S/G OC OC/C
DDM	147	Director	Dower Dant Engineering & Dianning Director	D	D	DH AMA 9 10	CAC	C	LID	1108	Sanior Spacialist	Human Recourses Senior Specialist	
DDM	140	Director	D Die Main Englistering of Finishing Director	n	n	011 /111 6-10	0/L C		III	1100	Constant	I and Resources Senior Specialist	
PPM	J48	Director	Power Plant Maintenance Director	к	OR/R	B W 0-8	5/6 00/0	. 00/0	FIR	3109	Specialist	Human Resources Specialist	NR/RR RR/OR B AD < 2 S NC/RC RC
PPM	J49	Manager	Power Plant Engineering Manager	R	OR/R	B M 6-8	S/G OC/C	C/C	F	J110	Director	Finance Director	OR R BH AM 8-10 G/L C C
PPM	J50	Manager	Power Plant Production Manager	R	OR/R	B M 6-8	S/G OC/C	OC/C	F	J111	Manager	Budgeting Manager	NR/RR OR/R B M 6-8 S/G OC OC/C
PPM	J51	Manager	Power Plant Material Demand Planning & Analysis Manager	RR/OF	RR/OR	B AD <2	S RC	RC	F	J112	Manager	Accounting Manager	NR/RR OR/R B M 6-8 S/G OC OC/C
PPM	152	Manager	Power Plant Maintenance Manager	PR/OF		B AD C2	S PC	PC .	F	1113	Manager	Insurance Manager	NP/PP OP/P B M 6-8 S/G OC OC/C
DDA	160	Manager	Down Diget Legisles Manager	RR/OF	nh/Uh		3 NC	nc .	-	7114	Manager	Taxan Manager	
PPM	355	widnager	Power Plant Logistics Manager	ĸ	ĸ	DR AM 8-10	G/L C	C	r	3114	wahager	ricasu y manager	MR/RK UK/K B M 6-8 S/G UC OC/C
PPM	J54	Section Manager	Power Plant Maintenance Section Manager	R	OR/R	B M 6-8	S/G OC/C	C OC/C	F	J115	Senior Specialist	Finance Senior Specialist	RR OR B AD 4-6 S/G RC RC/OC
PPM	J55	Senior Specialist	Power Plant Maintenance Senior Specialist	R	OR/R	B M 6-8	S/G OC/C	OC/C	F	J116	Specialist	Finance Specialist	NR/RR RR/OR B AD < 2 S NC/RC RC
PPM	J56	Specialist	Power Plant Production Planning Specialist	OR/R	OR	B M 6-8	S/G OC	OC/C	SM	J117	Director	Technical Sales & Marketing Director	OR R BH AM 8-10 G/L OC/C C
DDM	157	Specialist	Power Dant Materiale Demand Danning & Analysis Spacialist	CP	0.0	D M 46	s PC/0	00	SM	1118	Manager	Marketing Manager	NP/PP OP/P P M 68 C OC OC/C
DDM	150	Constaliat	Deven Plant Maintenne Demand r anning & Analysis Specialist	CR	OR I	0 10 4-0	5 RC/U	000	SM	1110	Manager	Color Manager	
PPM	J58	Specialist	Power Plant Maintenance Specialist	CR	RR	D AD 2-4	S RC	RC/OC	SM	J119	Manager	Sales Manager	NR/RR OR/R B M 6-8 G OC OC/C
PPM	J59	Supervisor	Power Plant Maintenance Supervisor	OR	RR	D AD < 2	S NC/R	C RC/OC	SM	J120	Senior Specialist	Marketing Senior Specialist	NR/RR OR B AD 4-6 S/G RC RC/OC
PPM	J60	Technician	Power Plant Technician	OR	OR	B AD 4-6	S/G RC/O	C RC/OC	SM	J121	Senior Specialist	Sales Senior Specialist	NR/RR RR/OR B AD < 2 S NC/RC RC
PPM	J61	Technician	Power Plant Support Technician	RR/OF	RR/OR	B AD < 2	S RC	RC	SM	J122	Specialist	Marketing Specialist	NR/RR OR B AD 4-6 S/G RC RC/OC
				- Martin Charles	-pany on	- 100 112	15 pros	Inc	SM	1123	Specialist	Salas Specialist	
									Sivi	5125	Specialist	Sales Specialist	NR/RR RR/OR B AD < 2 S NC/RC RC
									ADM	J124	Manager	Administration Support Manager	NR OR/R B M 6-8 S/G RC OC/C
									ADM	J125	Manager	Administration Support Manager	NR NR/RR HS F 2-4 BA NC NC
									ADM	J126	Manager	Director Office Manager	NR NR/RR HS F < 2 BA NC NC
									ADM	J127	Admin	Administration Support Coordinator	NR NR/RR HS E 4-6 BA NC/PC NC
									ADM	1100	Aduit	A devictor for and A sent	
									ADM	5128	Addition	Administration Support Agent	MR UN/K B M 6-8 S/G KC OC/C
									ADM	J129	Admin	Administration Support Supervisor	NR OR/R B M 6-8 S RC OC/C
									ADM	J130	Admin	Security Supervisor	NR NR/RR HS F < 2 BA NC NC
									ADM	J131	Admin	Security	NR NR/RR HS F < 2 BA NC NC

Figure 2. Rating of each job position with respect to each job evaluation criterion using linguistic terms.

			ino io in Elligan	she termis used in peri	onning (into in			
$\mathbf{Criteria} \rightarrow$	Technical Aviation Knowledge (C1)	Managerial Knowledge (C2)	Education (C3)	Professional Development (C4)	Work Experience (C5)	Communication Capabilities (C6)	Job Responsibilities (C7)	Decision Making Skills (C8)
Questions to be answered by Experts in order to Rate Each Job Position	To what extent do you think that "Technical Aviation Knowledge (C1)" is required for Job# x?	To what extent do you think that "Managerial Knowledge (C2)" is required for Job# x?	What is the minimum required level of education (i.e., degree) for Job# x?	What kind of professional devel- opment/training is more appropri- ate/suitable to be provided for Job# x?	What is the required level of experience for Job# x?	What kind of communication capabilities are required for Job# x?	To what extent do you think that "Job Responsibilities (C7)" are critical for Job# x?	To what extent do you think that "Decision Making Skills (C8)" are critical for Job# x?
	Considerably Considerably Bachelor Required Required Higher Degree (CR) (CR) (BH)		Bachelor with Preference of Higher Degree (BH)	Strategic & Decision Making (SD)	Very High Experience (>10)	Leading & Directing (L)	Extremely Critical (EC)	Extremely Critical (EC)
Linguistic Terms	RequiredRequiredBachelor(R)(R)(B)		Bachelor (B)	Advanced Managerial (AM)	High Experience (8–10)	Guiding & Controlling (G)	Critical (C)	Critical (C)
Used for Rating Each Job Position (i.e. used when answering the	Occasionally Required (OR)	Occasionally Required (OR)	Diploma (D)	Managerial (M)	Proper Experience (6–8)	Sending & Receiving (S)	Occasionally Critical (OC)	Occasionally Critical (OC)
corresponding question)	Rarely Required Rarely Required High School (RR) (RR) (HS)		Administrative (AD)	Acceptable Experience (4–6)	Basic (BA)	Rarely Critical (RC)	Rarely Critical (RC)	
	Not Required (NR)	Not Required (NR)		Fundamental (F)	Little Experience (2–4)		Not Critical (NC)	Not Critical (NC)
					Minimum Experience (<2)			

	Table 2.	Linguistic	terms	used in	performing	VIKOR
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				Table 2. Cont.				
Criteria $ ightarrow$	Technical Aviation Knowledge (C1)	Managerial Knowledge (C2)	Education (C3)	Professional Development (C4)	Work Experience (C5)	Communication Capabilities (C6)	Job Responsibilities (C7)	Decision Making Skills (C8)
	$CR \rightarrow 9$	$CR \rightarrow 9$				$L \to 6$	EC ightarrow 9	EC ightarrow 9
	$R \rightarrow 7$ $R \rightarrow 7$			(>10)	$G \rightarrow 4$	$C \rightarrow 7$	$C \rightarrow 7$	
The	$OR \rightarrow 5$	$OR \rightarrow 5$	BH V	$\text{SD} \rightarrow 5$	$(>10) \rightarrow 0$ (8, 10) $\rightarrow 5$	$S \rightarrow 2$	$OC \rightarrow 5$	$OC \rightarrow 5$
Corresponding	$RR \rightarrow 3$	$RR \rightarrow 3$	$DII \rightarrow 4$ B $\searrow 2$	AM ightarrow 4	$(6-10) \rightarrow 5$	$BA \rightarrow 1$	$RC \rightarrow 3$	$RC \rightarrow 3$
Numerical Rating	NR ightarrow 1	$NR \rightarrow 1$	$D \rightarrow 3$	M ightarrow 3	$(0-6) \rightarrow 4$		$NC \rightarrow 1$	$NC \rightarrow 1$
Values for Each	2, 4, 6, and 8 are	2, 4, 6, and 8 are	$D \rightarrow 2$	$\mathrm{AD} ightarrow 2$	$(4-0) \rightarrow 3$	5 and 3 are	2, 4, 6, and 8 are	2, 4, 6, and 8 are
Linguistic Term	in-between	in-between	$113 \rightarrow 1$	$F \rightarrow 1$	$(2-4) \rightarrow 2$	in-between	in-between	in-between
	judgmental rating	judgmental rating			$(\langle 2 \rangle \rightarrow 1$	judgmental rating	judgmental rating	judgmental rating
	values	values values				values	values	values

5. Results and Discussion

The contribution of the VIKOR algorithm to JE can be illustrated by an analysis of the results (Figures 3 and 4). The current or customized applications of the VIKOR algorithm can be clarified by three processes embedded in the computations of the proposed model: (1) grade assignment, (2) job position assignment, and (3) job category adjustment. Thus, distinguishing among them is very important.

i	Job ID #	Job Category	Job Title (i.e. Job Position)	Si	R _i	Qi	Q _{i+1} - Q _i	Status of Condit. 1	Status of Condit. 2	Grade	Q _i (updated for each set of compromise solution)	Q _M - Q _i	Procedural action needed to identify the range of the grade	Justification for	r the taken action	
1	J1	CEO	Chief Executive Officer (CEO)	0.044999	0.044998	0.029106	0.01865	TRUE	TRUE	nA			STOP	C1 and C2 are Fullfill	ed	
2	J87	Director	Aircraft Engineering Director	0.136212	0.028000	0.047755	0.00575	FALSE	TRUE	n-1	0.04776		CONTINUE	C1 Not Fullfilled		
3	J2	VP	Aircraft Maintenance Vice President 0.091605 0.044998 0.053507				0.00000	FALSE	FALSE	n-1		0.005752204	CONTINUE	Qm-Qi < DQ	Max M not reached yet	
4	J21	VP	Aircraft Component Maintenance Vice President	0.091605	0.044998	0.053507	0.00000	FALSE	FALSE	n-1		0.005752204	CONTINUE	Qm-Qi < DQ	Max M not reached yet	
5	J46	VP	Power Plant Maintenance Vice President	0.091605	0.044998	0.053507	0.08488	TRUE	TRUE	n-1		0.005752204	STOP	Qm-Qi < DQ	Max M reached	
6	J3	Director	Heavy Maintenance Director	0.163712	0.054999	0.108384	0.00800	FALSE	FALSE	n-2	0.10838	0.060629147	CONTINUE	C1 Not Fullfilled	†	
7	J4	Director	Aircraft Maintenance Director (Eastern Stations)	0.163712	0.054999	0.108884	0.00000	FALSE	FALSE	n-2		0.00000	CONTINUE	Qm-Qi < DQ	Max M not reached yet	
8	J <u>5</u>	Director	Aircraft Interior Maintenance Director	0.163712	0.054999	0.108384	0.00000	FALSE	FALSE	n-2		0.00000	C Once the	value of "Q _M - Q _i "	becomes ≥ DQ, the	
9	, Gr	ade n is ass	gned to only one JP, ptor	0.163712	0.054999	0.108384	0.00000	FALSE	FALSE	n-2		0.00000	cc correspo	onding job position	should be assigned to t	the
10	J J#1	(CEO), which	h has the lowest Q stern Stations)	0.163712	0.054999	0.108384	0.00000	FALSE	FALSE	n-2	/	0.80008	co <u>next set</u>	of the compromise	d solutions (i.e. Grade r	<u>n-2</u>).
11	, va	lue because	both conditions	0.163722	0.054999	0.108384	0.00000	FALSE	FALSE	n-2	·	0.00000	So, Grad	e n-2 is assigned to	J3 (Heavy Maintenanc	e
12	J; (a	cceptable ad	vantage and ing & Planning D	irecto 0 155712	0.054999	0.108384	0.00000	FALSE	STOP: as	sign Gra	ade n for	0.00000	Director).		
13	J: ac	ceptable sta	bility) are satisfied	0.163712	0.054999	0.108384	0.00000	FALSE	this J# O	NLY: Gr	ade n-1 to	0.00000	Consequ	ently, the <u>associat</u>	ed value of Q _i for this s	et of
14	J47	Director	Power Plant Engineering & Planning Director 🥢	0.163712	0.054999	0.108384	0.00000	FALSE	be assign	ned to t	he next J#	0.00000	compror	nised solutions (Gr	ade n-2) is updated in	
15	J53	Manager	It can also be observed that I	ircraft engin	eering		0.00000	FALSE	(J87 be	elow)		0.00000	condento	runn the associate	a computations require	2010
16	J98	Director	director) has the second lowest O	value which	imnlies	the	0.00065	FALSE				0.00000	CONTINUE	Qm-Qi < DQ	Max M not reached yet	
17	J32	AVP	immediate assigning of Grade n-1	Moreover.	hecause	the	0.00524	FALSE	TTRUE	n-2		0.00065	CONTINUE	Qm-Qi < DQ	Max M not reached yet	
18	J75	Director	associated value of $Q_{i+1} - Q_i = 0.00$	575 (i.e., = 0	0.053507	7 -	0.00589	FALSE	TRUE	n-2		0.00589	STOP	Qm-Qi < DQ	Max M reached	
19	J33	Director	0.045577 = 0.00575), which is less	than the va	lue of D	Q (i.e.,	0.00000	FALSE	FALSE	n-3	0.12016	0.01178	CONTINUE	Qm-Qi < DQ	Max M not reached vet	
20	J37	Manager	0.00575 < 0.007692), the acceptable advantage condition					FALSE	FALSE	n-3		0.00000	CONTINUE	Qm-Qi < DQ	Max M not reached yet	
21	J65	Director	(Condit. 1) is not satisfied. It shoul	d be noted t	hat the		0.00000	FALSE	FALSE	n-3		0.00000	CONTINUE	Qm-Qi < DQ	Max M not reached yet	
22	J94	Director	acceptable stability condition (Cor	ndit. 2) is sat	isfied.		0.00000	FALSE	FALSE	n-3		0.00000	CONTINUE	Qm-Qi < DQ	Max M not reached yet	
23	J102	Director	Accordingly, all JPs situated below	J _{#87} also rep	resent a	a set of	0.00000	FALSE	FALSE	n-3		0.00000	CONTINUE	Om-Qi < DQ	Max M not reached yet	
24	J110	Director	compromise solutions for Grade n	-1 as long as	their		0.04382	TRUE	TRUE	n-3		0.00000	STOP	0m-Qi < DQ	Max M reached	
25	J62	Director	corresponding values of $Q_M - Q_i <$	DQ (i.e., <0.	007692)		0.01767	TRUE	TRUE	n-4		0.04382		C1 and C2 are Fullfill	ed	
26	J117	Director	Consequently, Grade n-1 is assigned	ed to J _{#87} and	d three		0.12058	TRUE	TRUE	n-5				C1 and C2 are Fullfill	ed	
27	J88	Manager	additional JPs (Figure 3). Their cor	responding	values, C	$Q_M - Q_i$:	:	:	1	:	:	:	:	:	
			are less than DQ : specifically, " Q_M	- Qi''s value	es for $J_{\#_2}$, J _{#21} ,										
28	:	:	and $J_{#46} = 0.005752$, which is less t	nan DQ (< 0	.007692).	:	: :	:	:	:	:	:	:	:	
		L														
29	:		1 :	:	:	:	: :	: :	:	:	:	:	:	:	:	
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			5										:			
			/		-					•	•	•				
			Repeating the same proce	dures wit	th resp	ect to	the cond	dition	illustra	ated a	bove res	sults in 2	9 grades	for the 131 Jo	b Positions.	
			,										0.2.2.20			

Figure 3. Grade identification using the VIKOR algorithm.

		Original,	/Current Set				Proposed Set (VIKOR'S Resu	ults)			
Department*	Job ID #	Job Category	Job Title (i.e. Job Position)		Job ID #	Job Category	Job Title (i.e. Job Position)	Oi	Proposed	Proposed	Department
Department	00010#	ooo category			00010#	ooo category		Q1	Grade	Category	ceparament
MDO AM	J1 2	VP	Chief Executive Officer (CEO) Aircraft Maintenance Vice President		J1	CEO	Aircraft Engineering Director	0.02911	n n=1	CEO	MDO F
ACM	J21	VP	Aircraft Component Maintenance Vice President	/	J2	VP	Aircraft Maintenance Vice President	0.05351	n-1	Ps	AM
PPM SC	J46 .132	AVP	Power Plant Maintenance Vice President Assistant Vice president for Supply Chain Manager	nent	J21	VP	Aircraft Component Maintenance Vice President Power Plant Maintenance Vice President	0.05351	n-1	>	ACM PPM
AM	J3	Director	Heavy Maintenance Director		J3	Director	Heavy Maintenance Director	0.10838	n-2		AM
AM	J4 .15	Director	Aircraft Maintenance Director (Eastern Stations)		J4 .15	Director	Aircraft Maintenance Director (Eastern Stations) Aircraft Interior Maintenance Director	0.10838	n-2		AM
AM	JG	Director	Aircraft Production Planning Director	\times	JG	Director	Aircraft Production Planning Director	0.10838	n-2		AM
AM	J7	Director	Aircraft Maintenance Director (Western Stations)		J7 10	Director	Aircraft Maintenance Director (Western Stations)	0.10838	n-2		AM
ACM	J22	Director	Component Production Engineering & Planning D	rector	J22	Director	Component Production Engineering & Planning Dire	0.10838	n-2		ACM
ACM	J23	Director	Component Maintenance Director		J23	Director	Component Maintenance Director	0.10838	n-2		ACM
SC	J33 J34	Director	Warehousing and Logistics Director Inventory Management & Purchasing Director		J47	Manager	Power Plant Engineering & Planning Director Power Plant Logistics Manager	0.10838	n-2 n-2	LS	PPM
PPM	J47	Director	Power Plant Engineering & Planning Director	X	J98	Director	Maintenance Control Director	0.10838	n-2	cto	MCC
PPM TT	J48 J62	Director	Power Plant Maintenance Director	/	J32	AVP	Assistant Vice president for Supply Chain Manageme Plants & Equipment Maintenance Director	0.10904	n-2	oire	SC PEM
TC	J65	Director	Technical Contracts Director		J33	Director	Warehousing and Logistics Director	0.12016	n-3	-	SC
PEM	J75	Director	Plants & Equipment Maintenance Director		7 J37	Manager	Inventory Manager	0.12016	n-3		SC
STOA	.194	Director	Aircraft Engineering Director		.194	Director	Safety and Technical Duality Assurance Director	0.12016	n-3		STOA
MCC	J98	Director	Maintenance Control Director		J102	Director	Human Resources Director	0.12016	n-3		HB
HB	J102	Director	Human Resources Director	1	J110	Director	Finance Director	0.12016	n-3		F
F	J110	Director	Finance Director	\times	J62	Director	Technical Training Director	0.16398	n-4		TT
AM	J117 J9	Manager	Aircraft Maintenance Manager	$X \setminus$	J117 J88	Manager	Aircraft Configuration Manager	0.18165	n-5		E
AM	J10	Manager	Aircraft Maintenance Region Manager		J89	Manager	Technical Data & Publications Manager	0.30224	n-6		E
SC	J24 J35	Manager Manager	Warehousing and Logistics Manager		J90 J91	Manager Manager	Aircraft Engineering Support Manager	0.30224	n-6		E
SC	J36	Manager	Customs Receiving Manager		J9	Manager	Aircraft Maintenance Manager	0.30747	n-6	Ś	AM
SC	J37 J38	Manager	Inventory Manager		J24	Manager	Component Maintenance Manager Rower Plant Maintenance Director	0.30747	n-6	8 G	ACM PPM
SC	J39	Manager	Strategic Sourcing Manager	\backslash	J49	Manager	Power Plant Engineering Manager	0.30747	n-6	ana	PPM
PPM PPM	J49 J50	Manager	Power Plant Engineering Manager		J50	Manager Section Manag	Power Plant Production Manager	0.30747	n-6	Ξ	PPM
PPM	J51	Manager	Power Plant Material Demand Planning & Analysis	Manager	J55	Senior Special	i: Power Plant Maintenance Senior Specialist	0.30747	n-6		PPM
PPM	J52 J53	Manager	Power Plant Maintenance Manager Power Plant Logistics Manager		/ J63	Manager	Aircraft Technology & Maintenance Training Manage Human Factors & Begulation Training Manager	0.32168	n-7		TT
TT	J63	Manager	Aircraft Technology & Maintenance Training Manag	er	J99	Manager	Maintenance Control Manager	0.32299	n-7		MCC
TT	J64	Manager	Human Factors & Regulation Training Manager	N X /	1 J12	Shift Manager	Aircraft Maintenance Shift Manager	0.33346	n-8		AM
TC	J67	Manager	Technical Contracts Manager	1 / X	J67	Manager	Technical Contracts Manager	0.33346	n-8		TC
Ę	J68	Manager	Project Manager	I / /X	J95	Manager	Quality Assurance Manager	0.33346	n-8		STQA
ii I	J69 J70	Manager	Information Technology Manager		J103	Director	Inventory Management & Purchasing Director	0.33412	n-8		SC
PEM	J76	Manager	Equipment Maintenance Manager		J35	Manager	Warehousing and Logistics Manager	0.33935	n-8		SC
PEM	J77	Manager	Plants Equipment Engineering & Planning Manage		J38	Manager	Purchasing Manager	0.33935	n-8		SC
PEM	J78	Manager	Plants Maintenance Manager		J39	Manager Section Manager	Strategic Sourcing Manager	0.33935	n-8		SC
E	J88	Manager	Aircraft Configuration Manager	\mathbf{Y}	J104	Manager	Development and Performance Manager	0.33935	n-8		HB
E	J89	Manager	Technical Data & Publications Manager		J105	Manager	Assessment and Selection Manager	0.33935	n-8		HB
E	J90	Manager	Maintenance Program Manager		J10	Manager	Aircraft Maintenance Region Manager	0.34020	n-8	s	AM
STQA	J95	Manager	Guality Assurance Manager		J25	Section Manag	Component Maintenance Section Manager	0.34020	n-8	ge	ACM
MCC	J99	Manager	Maintenance Control Manager	I X∕	_ J56	Specialist	Power Plant Production Planning Specialist	0.34020	n-8	ana	PPM
HB	J103	Manager	Human Resources Strategy & Planning Manager		J107	Manager	Employee Relations, Services and Compensation Ma	0.35114	n-9	Ξ	HB
HB	.1105	Manager	Assessment and Selection Manager		.1119	Manager	Sales Manager	0.35179	n-9	_sr	SM
HB	J106	Manager	Recruitment and Administration Support Manager		J111	Manager	Budgeting Manager	0.35703	n-9	cti	F
HR	J107	Manager	Employee Relations, Services and Compensation N	lanager	J112	Manager	Accounting Manager	0.35703	n-9	S	F
E	J111 1112	Manager	Budgeting Manager		J113	Manager	Insurance Manager	0.35703	n-9		F
F	J113	Manager	Insurance Manager		J76	Manager	Equipment Maintenance Manager	0.40084	n-10		PEM
F	J114	Manager	Treasury Manager		J77	Manager	Plants Equipment Engineering & Planning Manager	0.40084	n-10		PEM
SM	J118	Manager	Marketing Manager		J79	Manager Section Manag	Tools & Equip. Purchasing & Inventory Manager	0.40084	n-10		PEM
ADM	J124	Manager	Administration Support Manager (I)	\ X	J73	Specialist	Systems Support Analyst	0.40739	n-10		IT
ADM	J125	Manager	Administration Support Manager (II)		J41	Section Manag	e Purchasing Section Manager	0.40757	n-10		SC
ADM	J126	Manager	Director Office Manager		7 J42	Senior Special	i: Procurement Senior Specialist	0.40757	n-10		SC
ACM	J25	Section Manager	Component Maintenance Section Manager		J74	Specialist	Data Processing Assistant	0.41262	n-11		ii
SC	J40	Section Manager	Inventory Section Manager		J106	Manager	Recruitment and Administration Support Manager	0.41262	n-11		HR
PPM	J54	Section Manager	Power Plant Maintenance Section Manager		J13	Senior Special	i: Senior Specialist- Aircraft Maintenance	0.43401	n-11 n-12		AM
PEM	J80	Section Manager	Planning Section Manager	MKV/V	J26	Senior Special	i: Component Maintenance Senior Specialist	0.43401	n-12		ACM
AM	J81 .112	Section Manager Shift Manager	Plants & Equipment Maintenance Section Manager		1 192	Senior Special	Power Plant Technician	0.43401	n-12		PPM F
AM	J13	Senior Specialist	Senior Specialist- Aircraft Maintenance	THEXT	J100	Senior Special	i: Maintenance Control Senior Specialist	0.43990	n-12	sts	MCC
ACM	J26 .142	Senior Specialist	Component Maintenance Service Specialist	XIX	J44	Specialist Section Manac	Procurement Specialist Plants & Equipment Maintenance Section Manager	0.44579	n-13	ilali	SC PEM
PPM	J55	Senior Specialist	Power Plant Maintenance Senior Specialist		J J124	Manager	Administration Support Manager (I)	0.48589	n-15	bec	ADM
E	J92	Senior Specialist	Aircraft Engineering Senior Specialist	X X X/1	J128	Admin	Administration Support Agent	0.48589	n-15	r S	ADM
MEC	J96 J100	Senior Specialist	Maintenance Centrol Senior Specialist		J129 J96	Senior Special	i: Quality Assurance Senior Specialist	0.49113	n-15 n-16	iŭ	STOA
HB	J108	Senior Specialist	Human Resources Senior Specialis		J108	Senior Special	i: Human Resources Senior Specialist	0.50728	n-16	Š	HB
F	J115	Senior Specialist	Finance Senior Specialist		J115	Senior Special	i: Finance Senior Specialist	0.50728	n-16		F
SM	J120	Senior Specialist	Marketing Senior Specialist		J120	Specialist	I: Marketing Senior Specialist Marketing Specialist	0.51317	n-16		SM
AM	J14	Specialist	Specialist-Aircraft Maintenance		J15	Specialist	Specialist- Materials Demand Planning & Analysis	0.51663	n-17		AM
AM	J15	Specialist	Specialist-Materials Demand Planning & Analysis		J14	Specialist	Specialist- Aircraft Maintenance	0.54595	n-18		AM
ACM	J27	Specialist	Component Maintenance Specialist		J27	Specialist	Component Maintenance Specialist	0.54595	n-18 n-18		ACM
ACM	J28	Specialist Specialist	Component Capacity Planning & Analysis Specialis	*/ / \\\	J28	Specialist	Component Capacity Planning & Analysis Specialist	0.54595	n-18		ACM
SC	J43 J44	Specialist	Procurement Specialist		V J52	Manager	Power Plant Material Demand Manning & Analysis M Power Plant Maintenance Manager	0.54595	n-18 n-18		PPM
SC	J45	Specialist	Warehouses Services Specialist		7 J61	Technician	Power Plant Support Technician	0.54595	n-18	sts	PPM
PPM	J57	Specialist	Power Plant Materials Demand Planning & Analysis	Specialist	J45	Specialist	Warehouses Services Specialist	0.54660	n-18	ilali	SC
PPM	J58	Specialist	Power Plant Maintenance Specialist		J43	Specialist	Strategic Sourcing Specialist	0.55184	n-18	bec	SC
IT	J71 J72	Specialist	Network Specialist		J93 J97	Specialist	Aircrart Engineering Specialist Quality Assurance Specialist	0.55184	n-18 n-18	S	STOA
іт	J73	Specialist	Systems Support Analyst		J36	Manager	Customs Receiving Manager	0.55773	n-19		SC
IT	J74	Specialist	Data Processing Assistant	\sim	Jea	Manager	Performance Management & PMD Manager	0.56362	n-19		IT
E STDA	J93	Specialist	Aircrart Engineering Specialist		J70 J71	Specialist	Information Technology Manager	0.56362	n-19		IT
MCC	J101	Specialist	Maintenance Control Specialist		J72	Specialist	Network Specialist	0.56362	n-19		iii I
HB	J109	Specialist	Human Resources Specialist	AN V	7 J19	Technician	Aircraft Maintenance Support Technician	0.59287	n-20	S	AM
F	J116	Specialist	Finance Specialist		> J20	Technician	Aircraft Maintenance Technician	0.59287	n-20	i vis	AM
SM	J123	Specialist	Sales Specialist	the	J57	Specialist	Power Plant Materials Demand Planning & Analusis	0.59287	n-20	Supe	PPM
AM	J17	Supervisor	Aircraft Maintenance Senior Supervisor	ZH/	J85	Technician	Facility & Equipment Maintenance Technician	0.61485	n-21		PEM
AM	J18 J29	Supervisor	Aircraft Maintenance Supervisor Aircraft Component Maintenance Supervisor	HT	→ J86	Technician Specialist	Ground Support Equipment Technician Human Resources Specialist	0.61485	n-21		PEM HB
PPM	J59	Supervisor	Power Plant Maintenance Supervisor		> J116	Specialist	Finance Specialist	0.61922	n-21		F
PEM	J82	Supervisor	Plants & Equipment Maintenance Supervisor	11	J121	Senior Special	i: Sales Senior Specialist Sales Specialist	0.61922	n-21	S	SM
AM	J20	Technician	Aircraft Maintenance Technician	11	> J18	Supervisor	Aircraft Maintenance Supervisor	0.62951	n-22	cian	AM
ACM	J30	Technician	Aircraft Component Technician		> J82	Supervisor	Plants & Equipment Maintenance Supervisor	0.63083	n-22	inic	PEM
PPM	J60	Technician	Power Plant Technician		J58	Specialist	Power Plant Maintenance Specialist	0.64390	n-23	ect	PPM
PPM	J61	Technician	Power Plant Support Technician	1 V	J83	Technician	Ground Support Equipment Technician	0.65856	n-24	F	PEM
PEM	J83 J84	Technician	Facility Plant Technician	11	J84	Supervisor	Aircraft Maintenance Senior Supervisor	0.69652	n-24 n-25		AM
PEM	J85	Technician	Facility & Equipment Maintenance Technician	1	J31	Technician	Aircraft Component Support Technician	0.69652	n-25		ACM
PEM	J86	Technician	Ground Support Equipment Technician		¥ J59	Supervisor	Power Plant Maintenance Supervisor	0.69652	n-25		PPM
ADM ADM	J127 J128	Admin	Administration Support Coordinator Administration Support Agent		J127	Manager	Administration Support Coordinator Administration Support Manager (II)	0.95627	n-26	sc	ADM
ADM	J129	Admin	Administration Support Supervisor		V J126	Manager	Director Office Manager	0.99999	n-28	i i i	ADM
ADM	J130	Admin	Security Supervisor		J130	Admin	Security Supervisor	0.99999	n-28	Ad	ADM
ADM	0131	89000	Journy	1	0131	AUTIN	Jocumy	0.33333	1-28		ADM
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		T	So the total number of concreted	rades = 20 /: 4	rom "er	n" where C	rade a indecator Grade 20 /i.e. a = 20	ICEO	¥		
			so the total number of generated g	ades = 29 (I.e., †	toin to	where G	Face n indecates Grade 29 (i.e., $n = 29$	[CEO]	/		
		1	un pottom where Grade n-28 ind	ncates Grade 1 (i	.e., n = 1	11					

Upword-Modulated Action Down

Downword-Modulated Action

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Figure 4. Proposed job positions, grades, and categories.

5.1. Grade Assignment

The grade assignment process emerged from the application of the VIKOR algorithm through which *job positions* are prioritized. As previously illustrated in the VIKOR steps, *JPs* are ranked in descending order by their *Q* scores. Therefore, for *n JPs* (J_i , J_{i+1} , ..., J_n), J_i is ranked first in Grade *n* only if the acceptable advantage condition and the acceptable stability in decision making are satisfied. Otherwise, J_i and J_{i+1} are considered compromise solutions if only the acceptable stability condition is not satisfied. However, if the acceptable advantage condition are represented by J_i , J_{i+1} , ..., J_M for the maximum *M* that satisfies the following: $Q_{JM} - Q_{Ji} < DQ$, where DQ = 1/(J - 1) or 0.007692 in the current study.

Hence, Grade *n* is assigned to only one *JP*, $J_{\#1}$ (CEO), which has the lowest *Q* value because both conditions (acceptable advantage and acceptable stability) are satisfied (Figure 3). It can also be observed that $J_{\#87}$ (aircraft engineering director) has the second lowest *Q* value, which implies the immediate assigning of Grade n - 1. Moreover, because the associated value of $Q_{i+1} - Q_i = 0.00575$ (i.e., = 0.053507 - 0.045577 = 0.00575), which is less than the value of DQ (i.e., 0.00575 < 0.007692), the acceptable advantage condition (Condit. 1) is not satisfied. It should be noted that the acceptable stability condition (Condit. 2) is satisfied. Accordingly, all *JPs* situated below $J_{\#87}$ also represent a *set of compromise solutions* for *Grade* n - 1 as long as their corresponding values of $Q_M - Q_i < DQ$ (i.e., < 0.007692). Consequently, Grade n - 1 is assigned to $J_{\#87}$ and three additional *JPs* (Figure 3). Their corresponding values, $Q_M - Q_i$, are less than *DQ*: specifically, " $Q_M - Q_i$ "'s values for $J_{\#21}$, $J_{\#21}$, and $J_{\#46} = 0.005752$, which is less than *DQ* (< 0.007692).

5.2. Job Position Assignment

Once the grade assignment process is completed, the job position assignment process can be applied with respect to two job-resizing actions. One of the outcomes is the creation of what can be referred to as VIKOR-based job-resizing actions: (1) upward-modulated and (2) downward-modulated. Accordingly, it can be clearly seen (Figure 4) that one of the director-level positions, J_{#87} (aircraft engineering director), is situated above the vice president positions. Such an outcome reveals the necessity for creating a new vice president for aircraft engineering position. Consequently, four vice president positions are supposed to represent Grade n - 1 (Figure 4). It can be observed that almost all the director-level positions are assigned to Grades n - 2, n - 3, n - 4, and n - 5. However, the sole assistant vice president position ($J_{#32}$, assistant vice president for supply chain management) and two managerial job positions ($J_{#53}$, power plant logistics manager and $J_{#37}$, inventory manager) are situated in these director-level positions. This implies that two managerial positions $(J_{\#53} \text{ and } J_{\#37})$ have to be resized (*upward-modulated action*) through the creation of two director-level positions dedicated to power plant logistics and inventory management. Similarly, the sole assistant vice president position is supposed to be resized into a directorlevel position to manage the supply chain management department. Several upwardmodulated actions and downward-modulated actions are illustrated in Figure 4.

5.3. Job Category Adjustment

The results indicate that most of the current managerial positions (before the application of the *category adjustment process*) corresponded to Grades n - 6, n - 7, n - 8, n - 9, n - 10, and n - 11. However, the proposal is for only Grades n - 6 and n - 7 to be assigned to the managerial category (Proposed Category column in Figure 4). The reason is that if Grade n - 8 is assigned to the managerial positions, then the proposed section manager category will have no representatives from seven departments (TC, TT, IT, PEM, E, STQA, and MCC). Therefore, the proposal is for Grade n - 8 to be assigned to the section manager *category*. It should be noted that assigning Grades n - 6 and n - 7 to the managerial positions satisfies the proposed condition that, as far as possible, at least one representative from each department should belong to each *JP category*. Such a condition is very important for ensuring the harmonization of the current and proposed departmental structures. By continuing the *category adjustment process* with respect to the proposed condition above, all *JPs* can then be assigned to their corresponding *categories* (Figure 4).

5.4. General Discussion

Since personal selection is a challenging dilemma, HR authorities in any firm are responsible for handling such an issue by considering different MCDM research attempts, including VIKOR applications (Krishankumar et al. 2020). Hence, although the issue of personal selection has commonly and traditionally been addressed using simplified criteria-oriented approaches (Thomas 2004; Blue et al. 2013; Thorndike 1949; Robertson and Smith 2001; Schmit and Ryan 1993), several research attempts have employed various sophisticated method-oriented approaches (Safari et al. 2014; Kabak et al. 2012; Islam and Rasad 2005; Gibney and Shang 2007; Boran et al. 2008). Indeed, Alguliyev et al. (2015) emphasized that personnel evaluation is a critical HRM issue due to its nature of multicriteria and its complexity through the existence of various quantitative as well as qualitative aspects, which imply that for such an evaluation process, subjective, unreliable, and/or invalid approaches "no longer suffice". Hence, such an issue "is a complicated MCDM problem in which candidates must be prioritized in a rational manner and a suitable personnel must be selected" (Krishankumar et al. 2020). Therefore, VIKOR has been employed empirically in several HRM research works that incorporate personnel and/or job criteria in order to develop innovative models for handling such a dilemma (Alguliyev et al. 2015; Krishankumar et al. 2020). From this point of view, the applicability of VIKOR can be extended to handle the issue of job evaluation as a rational extension of the issue of personnel selection; particularly, because both of the issues are identical in a sense that any criterion in any of their different models can be mutually set for exchangeable employment.

In any MCDM problem, tools such as AHP, TOPSIS, VIKOR, ELECTRE, PROMETHEE, and DEA are effective and commonly employed to evaluate a various set of alternatives considering multiple and conflicting criteria (Chang et al. 2013; Yu et al. 2013; Paksoy et al. 2012) such as in the case of personnel and/or job evaluation problem (Krishankumar et al. 2020). These techniques can assist practitioners to be cognizant of as well as able to deal with the integrated assessments' outcomes (Algulivev et al. 2015). However, not all MCDM tools and techniques share the same applicability. For instance, AHP has always been criticized because it limits the proposed solution into a static form of a hierarchal structure (Hellebrandt et al. 2018) and due to the limited number of the involved criteria and alternatives in any AHP decision-making model (Shih et al. 2007). Likewise, as a rule of thumb in DEA applications, the number of alternatives should be greater than the total number of inputs and outputs (i.e., total number of criteria) in order to ensure accurate implementation of the DEA model (Alidrisi et al. 2019; Guevel 2020). However, among these MCDM approaches, it can be clearly noticed that TOPSIS and VIKOR are the most suitable and applicable for handling the personnel/job evaluation issue due to the capability of constructing an MCDM model with an unlimited number of criteria and alternatives, the clarity of the outcomes, and the ability to deal easily with different kinds of characteristics and decision alternatives (Parameshwaran et al. 2015). In particular, Alguliyev et al. (2015) stated that one of the attributes of VIKOR is that the aggregate function always generates the best results that are closed to the ideal solutions, which is not the case in TOPSIS. They clearly stated that VIKOR, specifically, is a useful MCDM method "in a situation where the decision-maker is not able or does not know how to express preference in the beginning of system design". They concluded that "VIKOR ranks alternatives and determines the solution named compromise that is the closest to the ideal".

6. Conclusions

A poorly defined JE system eventually creates the dilemma of mismatches between employee competencies and responsibilities and, consequently, wages. This results in employee dissatisfaction, which ultimately exacerbates staff attrition (i.e., employee turnover), which is costly because of the loss of talented employees. Indeed, the loss of human capital creates the conditions for a series of uncontrollable costs and expenses and the loss of potential opportunities. This paper argues that poorly defined and/or ill-managed job evaluation systems represent a key HRM issue that should be addressed. Thus, VIKOR has been proposed as a decision-analysis tool to manage the complexities of the JE process.

The results indicate that 29 grades are appropriate for the investigated aviation firm. This outcome was facilitated by the two implicit conditions in the VIKOR algorithm: acceptable advantage condition and acceptable stability condition. Thus, for such applications, VIKOR is superior to MCDM techniques. These two conditions represent the mechanism through which the *grade assignment process* was executed. The resulting ranked list of job titles with the corresponding grades indicates the necessity for conducting the job positions assignment process as an inevitable consequence of the Q score determined for each position. This was illustrated in the introduction of the two VIKOR-based job-resizing actions: (1) upward-modulated action and (2) downward-modulated action. For example, the upward*modulated action* indicates that $J_{\#73}$ (systems support analyst) deserves to be assigned *Grade* n - 10 as a "section manager" rather than an "analyst—in the specialist category" (which is relatively far below the top management positions). Inverse inferences can be made for the *downward-modulated action*. Such actions imply the need for *category* determinations to delineate the scope of each category, as illustrated above. In sum, this paper introduces VIKOR as a tool to improve the precision of JEs. The idea of matching the generated compromise solutions in the form of grades indicates the uniqueness of the technique in terms of its compatibility and flexibility.

The present study asserts that the proposed VIKOR algorithm helps to determine grades, to suggest suitable job positions within each grade, and to define the scope of each job category. However, JE or HRM issues should be examined in detail by practitioners, decision-makers, and/or academicians. For example, the acceptance of the *upward-modulated action* and the *downward-modulated action* requires the development of a new job description and analysis, and this, in turn, implies changes in the responsibilities and worth of each job. Decision-makers are responsible for these strategic HRM decisions because the consequences of modifying several job positions could lead to the very costly process of reforming the organizational structure. The costs of such a project must be carefully weighed against those associated with the loss of dissatisfied employees. Such issues offer several directions for future JE and HRM research and innovative managerial practices. Finally, HRM authorities and responsibilities for such a critical and huge strategic initiative/exercise should be carefully monitored and controlled in order to ensure a fair job evaluation process/project. Third parties might be employed to play their role as consultation agencies in order to handle such a managerial dilemma. MCDM applications should be expanded to consider various HRM practical issues such as job evaluation. Although many HRM aspects have been handled using various MCDM techniques such as AHP, TOPSIS, and DEA, there is still room for employing several tools, such as VIKOR, to handle job evaluation dilemmas in particular. Yet, only limited research attempts (i.e., MCDM applications) have shown such a contribution in the relevant literature.

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