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SELECTING THE BEST MULTI-ROLE ARTIST OF ROCK BANDS OF IRAN IN 2000s BY APPLYING ANP AND TOPSIS GREY

Abstract. *One of important thing that causes a band be famous is multi-role artists. A person with several abilities more than singing that help band to compose better songs. These artists are very famous but awards don't consider any special award for them. Life of rock genre is to short in Iran but during these years many bands work in Iran while there isn't music industry in this country. However this genre developed and found many fans in Iran and the aim of this research in selecting best multi-role artist of rock bands of Iran in 2000s. In this study four famous artists selected that they are: Shahram Sharbaf, Kaveh Afagh, Kaveh Yaghmaei and Erwin Khachikian. ANP and TOPSIS Grey applied for evaluating these artists that at first ANP used for identifying importance of criteria and TOPSIS Grey applied for final evaluating among alternatives. Final result is Kaveh Yaghmaei is the best multi-role artist of rock bands in last decade of Iran and Kaveh Afagh, Shahram Sharbaf and Erwin Khachikian are after him. This study can be considered in international awards as a framework and a special award for these artists.*

Key words: *Multi-role artist, Rock Bands, ANP, TOPSIS Grey.*
JEL Classification: C44, C61

1. Introduction

Musical genres, the high-level descriptor of music which are created and used by humans for categorizing and describing the vast universe of music are extensively used in music stores, radio stations, and the Internet (Jang *et al.* 2008). Rock music is a genre of popular music that developed during and after the 1960s. It has its roots in 1940s and 1950s rock and roll, rhythm and blues, country music and also drew on folk music, jazz and classical music. The sound of rock often revolves around the electric guitar, bass guitar, drums, and keyboard instruments such as Hammond organ, piano, or, since the late 60s, synthesizers. Rock music typically uses simple rhythms in a 4/4 meter; with a repetitive snare drum back beat on beats two and four (Hashemkhani Zolfani *et al.* 2011a). A group of musicians specializing in rock music is called a rock band or rock group. Many rock groups consist of an electric guitarist, lead singer, bass guitarist, and a drummer, forming a quartet (Hashemkhani Zolfani *et al*. 2011a). Rock music is the most popular cultural phenomenon of the second half of the twentieth century and the single greatest propagator of the moral, social, and religious values of our society. Social analysts concur that rock music has become a primary force in shaping the thinking and life-style of this generation (Bacchiocchi 1999). In the past decade rock genre had a professional change and experience and many young boys and girls have liked to be a rock star and a professional musician in rock genre. We can see people all around world who like to listen to rock bands and rock superstars (Hashemkhani Zolfani *et al.* 2011a).

Selecting the best musician or singer always is so hard and there isn't a specific method (Hashemkhani Zolfani *et al.* 2011b). Selecting and ranking musicians and rock bands always are so complicated (Hashemkhani Zolfani *et al.* 2011a). Multi-role is referred to a singer in a band who besides singing does some other key roles such as playing, composing, etc. (Hashemkhani Zolfani *et al.* 2011b). Rock genre is known new genre of music and hasn't old history in Iran. The aim of this research is identifying best multi-role artist of Iran in last decade of Iran. This research applies ANP and TOPSIS Grey for evaluating and selecting best multi-role artist of rock bands in Iran. Results and framework of this research can be applied as a model for awards.

The recent researches about evaluating of rock bands are listed below:

- Hashemkhani Zolfani *et al.* (2011a) applied Fuzzy AHP and VIKOR for evaluating rock bands of Finland in 2000s.
- Hashemkhani Zolfani *et al.* (2011b) used AHP and TOPSIS for selecting best multi-role artist of rock bands in 2000s.

2. Methodology

Over the past decades the complexity of economic decisions has increased rapidly, thus highlighting the importance of developing and implementing sophisticated and efficient quantitative analysis techniques for supporting and aiding economic decision-making (Šaparauskas, Turskis 2006; Zavadskas and Turskis 2011; Šaparauskas *et al.* 2011). Multiple criteria decision making (MCDM) is an advanced field of operations research, provides decision makers and analysts a wide range of methodologies, which are overviewed and well suited to the complexity of economical decision problems (Hwang and Yoon 1981; Zopounidis and Doumpos 2002; Figueira *et al.* 2005). Multiple criteria analysis (MCA) provides a framework for breaking a problem into its constituent parts. MCA provides a means to investigate a number of alternatives in light of conflicting priorities. (Kaplinski and Tupenaite 2011; Kapliński and Tamosaitiene 2010; Tamosaitiene *et al.* 2010). Over the last decade scientists and researchers have developed a set of new MCDM methods (Kaplinski and Tupenaite 2011; Kapliński and Tamosaitiene 2010; Tamosaitiene *et al.* 2010). They modified methods and applied to solve practical and scientific problems. Solving of modern decision making problems in most cases is based on integrated model of different approaches. There is a wide range of methods based on multi-criteria utility theory: SAW (MacCrimon 1968; Ginevičius *et al.* 2008a,b); TOPSIS (Hwang and Yoon 1981); VIKOR – compromise ranking method (Opricovic and Tzeng 2004); COPRAS (Zavadskas *et al*. 2008, 2009); and other methods (Turskis 2008; Turskis *et al*. 2009). Decision-makers in their activities deal with uncertain future. The multi criteria decision-making could be applied to assess different alternatives of future activities. Hui *et al.* (2009) incorporated the fuzzy concept in linear programming to obtain the best possible outcome in portfolios, when direct real estate investment is included.

The best strategy could be selected from available scenarios, and information. In strategic decisions, dealing with uncertainty, the values of criteria could be determined at intervals – from pessimistic value to optimistic value.

The limits of criterion value could also be determined by expert and determination of limits depends on the qualification and experience of expert. Therefore it is better to collect the objective data (Zavadskas *et al.* 2010).

Deng (1982) developed the Grey system theory and described operations with grey numbers. Grey relational analysis possesses advantages (Deng 1989):

– involves simple calculations,

– requires smaller samples,

– A typical distribution of samples is not needed,

– The quantified outcomes from the Grey relational grade do not result in contradictory conclusions to qualitative analysis,

– The Grey relational grade model is a transfer functional model that is effective in dealing with discrete data.

This paper presents the application of ANP and TOPSIS grey methods for the case study of evaluating and selecting best multi-role artist of rock bands in Iran.

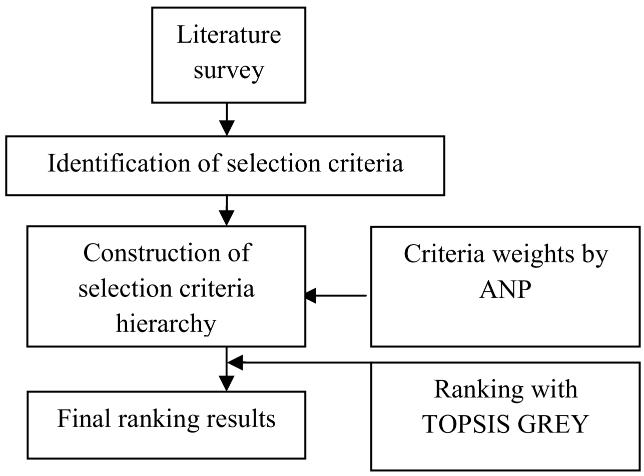

Figure 1- Process of selecting best multi-role artist of Iran

2.1. Analytic Network Process

The ANP, also introduced by Saaty, is a generalization of the AHP (Saaty 1996). Saaty (1996) suggested the use of AHP to solve the problem of independence on alternatives or criteria, and the use of ANP to solve the problem of dependence among alternatives or criteria. Many decision-making problems cannot be structured hierarchically because they involve the interaction and dependence of higher level elements on lower level elements (Saaty and Takizawa 1986).This is a network system. However in ANP, criteria in the lower level may provide feedback to the criteria in the higher level, and the Inter dependence among the criteria in the same level is permitted (Liang and Li 2007). Another difference between AHP and ANP in calculation process is that a new concept “supermatrix” is introduced in ANP (Liang and Li 2007).
The recent applications of ANP method in shortly are listed below:

- Boran *et al.* (2008) used ANP for personnel selection.
- Dagdeviren *et al.* (2008) applied fuzzy ANP model to identify faulty behavior risk (FBR) in work system.
- Ayag and Ozdemir (2009) applied fuzzy ANP approach to concept selection.
- Yazgan (2010) applied fuzzy ANP for selection of dispatching rules.
- Kuo (2011) used ANP, Fuzzy DEMATEL and TOPSIS in international distribution center locating problem.

- Azimi *et al.* (2011) used ANP and TOPSIS ranking strategies of mining sector.
- Garcia-Melon *et al.* (2010) applied ANP approach to assess sustainability of tourist strategies.

The application steps of ANP are as follows (Saaty 1999; Saaty; 2001):

Forming the Network Structure

Firstly, criteria, sub criteria and alternatives are defined. Then, the clusters of elements are determined. Network is formed based on relationship among clusters and within elements in each cluster. There are few different relationships that have effects. Direct effect may be considered as a regular dependency in a standard hierarchy. Indirect effect dependency of which is not direct and must flow through another criteria or alternatives. Another effect is the self-interaction one. Last are interdependencies among criteria which form a mutual effect.

Forming Pairwise Comparison Matrices and Obtaining Priority Vector

Pair wise comparisons are performed on the elements within the clusters as they influence each cluster and on those that it influences, with respect to that criterion. The pairwise comparisons are made with respect to a criterion or sub-criterion of the control hierarchy (Saaty 1999). Thus, importance weights of factors are determined. In pairwise comparison, decision makers compare two elements. Then, they determine the contribution of factors to the result (Saaty 2001).

In ANP, like AHP, it is formed pairwise comparison matrices with use 1-9 scale of relative importance proposed by Saaty (Saaty 1996). 1-9 scale of relative importance is given in Table 1.

Table 1- Scale of Relative Importance (Adapted from Saaty (Saaty 1980) and Vargas (Saaty and Vargas 2006)

Intensity of importance	Definition
1	Equal importance
3	Moderate importance
5	Essential or strong importance
7	Very strong importance
9	Extreme importance
2,4,6,8	Intermediate value between adjacent scale values

The values of pairwise comparisons are allocated in comparison matrix and local priority vector is obtained from eigenvector which is calculated from this equation:

$$AW=\lambda_{enb}w \quad (1)$$

In this equation, A, W and λ_{enb} stands for the pairwise comparison matrix, eigenvector and eigenvalue, respectively.
Saaty has proposed normalization algorithm for approximate solution for w (Saaty, 1980).
The matrix which shows the comparison between factors is obtained as follows:

$$A=\lfloor a_{ij} \rfloor_{n\times n} \quad i=1,\dots\dots,n;\ j=1,\dots\dots,n \quad (2)$$

Significance distribution of factors as percentage is obtained as follows:

$$B_i=\lfloor b_{ij} \rfloor_{n\times 1} \quad i=1,\dots\dots\dots,n \quad (3)$$

$$b_{ij}=\frac{a_{ij}}{\sum_{i=1}^{n} a_{ij}} \quad (4)$$

$$C=\lfloor b_{ij} \rfloor_{n\times n} \quad i=1,\dots\dots,n \quad j=1,\dots\dots,n \quad (5)$$

$$w_i=\frac{\sum_{j=1}^{n} c_{ij}}{n} \quad W=\lfloor w_i \rfloor_{n\times 1} \quad (6)$$

Forming Super matrix and Limit Super Matrix

The overall structure of super matrix is similar to Markov chain process (Saaty 1996; Saaty 2005). To obtain global priority in a system that has interdependent effects, all local priority vectors are allocated to the relevant columns of super matrix. Consequently, super matrix is a limited matrix and every part of it shows the relationship between two elements in the system. The long term relative impacts of the elements to each other are obtained by raising the super matrix power. To equalize the importance weights, power of the matrix is raised to the $2k+1$, where k is an arbitrary large number. The new matrix is called limited Super matrix (Saaty 1996). The consistency of elements comparisons are calculated as follows:

$$D = \lfloor a_{ij} \rfloor_{n\times n} \times \lfloor w_i \rfloor_{n\times 1} = \lfloor d_i \rfloor_{n\times 1} \quad (7)$$

$$E_i = \frac{d_i}{w_i}, \quad i=1,\dots,n \quad (8)$$

$$\lambda = \frac{\sum_{i=1}^{n} E_i}{n} \quad (9)$$

$$CI = \frac{\lambda - n}{n-1} \quad (10)$$

$$CR = \frac{CI}{RI} \quad (11)$$

In the equations above, *CI*, *RI* and *CR* represent consistency indicator, random indicator and consistency ratio, respectively. Consistency of pairwise matrix is checked by consistency index (*CI*). For accepted consistency, *CI* must be smaller than 0.10 (Saaty 1980).

2.2. Technique for Order Preference by Similarity to Ideal Solution (TOPSIS)

The TOPSIS method was developed by Hwang and Yoon (1981). TOPSIS method belongs to MCDM (Multi-criteria decision-making method) group and identifies solutions from a finite set of alternatives based upon simultaneous minimization of distance from an ideal point and maximization of distance from a negative ideal point. TOPSIS can incorporate relative weights of criteria. The only subjective input needed is weights. Lin *et al.* (2008) developed TOPSIS method with grey number operations to the problem solution with uncertain information.

TOPSIS method was applied in many fields:

- to contractor selection for construction works (Zavadskas *et al.* 2010b),
- to risk assessment of construction projects (Zavadskas *et al.* 2010a),
- to selection of the strategic alliance partner (Buyukozkan *et al.* 2008),
- for supplier selection with TOPSIS method (Boran *et al.* 2009),
- to risk evaluation in workplaces (Grassi *et al.* 2009),
- to customer evaluation using fuzzy methods based on TOPSIS (Chamodrakas *et al*. 2009), in safety management (Yang *et al.* 2009),

- for multicriteria evaluation of competitive strategies of enterprises (Ginevičius *et al.*2010),
- for a comparison of the regional aircraft parameters (Čokorilo *et al.* 2010)
- solving hybrid multiple attributes decision-making problems under risk (Han, Liu 2011),
- for ranking for state forest enterprises (Kučas 2010).

2.3. TOPSIS method with criteria values determined at intervals

The TOPSIS method is one of the best described mathematically and not simple for practical using. Lin *et al.* (2008) proposed the model of TOPSIS method with attributes values determined at intervals that includes the following steps:

Step 1: Selecting the set of the most important attributes, describing the alternatives.

Step 2: Constructing the decision-making matrix $\otimes X$. Grey number matrix $\otimes X$ can be defined as:

$$\otimes X = \begin{bmatrix} \otimes x_{11} & \otimes x_{12} & \dots & \otimes x_{1m} \\ \otimes x_{21} & \otimes x_{22} & \dots & \otimes x_{2m} \\ \dots & \dots & \dots & \dots \\ \otimes x_{n1} & \otimes x_{n2} & \dots & \otimes x_{nm} \end{bmatrix}; \; i = \overline{1,\, n},\; j = \overline{1,\, m}. \quad (12)$$

Where $\otimes x_{ij}$ denotes the grey evaluations of the i-th alternative with respect to the j-th attribute; $[\otimes x_{i1}, \otimes x_{i2}, \dots, \otimes x_{im}]$ is the grey number evaluation series of the i-th alternative.

Step 3: Construct the normalized grey decision matrices. The normalized values of maximizing attributes are calculated as:

$$\otimes \bar{x}_{ij,b} = \frac{\otimes x_{ij}}{\max_i^{(b_{ij})}} = \left(\frac{w_{ij}}{\max_i^{(b_{ij})}},\; \frac{b_{ij}}{\max_i^{(b_{ij})}} \right). \quad (13)$$

The normalized values of minimizing attributes are calculated by Lin *et al.* (2008):

$$\otimes \bar{x}_{ij,w} = 1 - \frac{\otimes x_{ij}}{\max_i^{(b_{ij})}} = \left(1 - \frac{b_{ij}}{\max_i^{(b_{ij})}};\; 1 - \frac{w_{ij}}{\max_i^{(b_{ij})}} \right). \quad (14)$$

Step 4: Determining weights of the criteria q_j.

Step 5: Construct the grey weighted normalized decision-making matrix.

Step 6: Determine the positive and negative ideal alternatives for each decision-maker. The positive ideal alternative A^+, and the negative ideal alternative A^- can be defined as:

$$A^+ = \left\{\left(\max_i^{b_{ij}} \middle| j \in J\right), \left(\min_i^{w_{ij}} \middle| j \in J\right) \middle| i \in n\right\} = \left[x_1^+, x_2^+, ..., x_m^+\right] \quad (15)$$

and

$$A^- = \left\{\left(\min_i^{w_{ij}} \middle| j \in J\right), \left(\max_i^{b_{ij}} \middle| j \in J'\right) \middle| i \in n\right\} = \left[x_1^-, x_2^-, ..., x_m^-\right] \quad (16)$$

Step 7: Calculate the separation measure from the positive and negative ideal alternatives, d_i^+ and d_i^-, for the group. There are two sub-steps to be considered: the first one concerns the separation measure for individuals; the second one aggregates their measures for the group.

Calculate the measures from the positive and negative ideal alternatives individually. For decision-maker k, the separation measures from the positive ideal alternative d_i^+ and negative ideal alternative d_i^- are computed through weighted grey number as:

$$d_i^+ = \left\{\frac{1}{2}\sum_{j=1}^{m} q_j \left[\left|x_j^+ - w_{ij}^-\right|^p + \left|x_j^+ - b_{ij}^-\right|^p\right]\right\}^{\frac{1}{p}}; \quad (17)$$

$$d_i^- = \left\{\frac{1}{2}\sum_{j=1}^{m} q_j \left[\left|x_j^- - w_{ij}^-\right|^p + \left|x_j^- - b_{ij}^-\right|^p\right]\right\}^{\frac{1}{p}}. \quad (18)$$

In equations (17) and (18), for $p \geq 1$ and integer, q_j is the weight for the attribute j, which can be determined by attribute weight determination methods. If $p = 2$, then the metric is a weighted grey number Euclidean distance function. Equations (17) and (18) will be as follows:

$$d_i^+ = \sqrt{\frac{1}{2}\sum_{j=1}^{m} q_j \left[\left|x_j^{k+} - \overline{w}_{ij}^k\right|^2 + \left|x_j^{k+} - \overline{b}_{ij}^k\right|^2\right]}, \quad (19)$$

$$d_i^- = \sqrt{\frac{1}{2}\sum_{j=1}^{m} q_j \left[\left|x_j^{k-} - \overline{w}_{ij}^k\right|^2 + \left|x_j^{k-} - \overline{b}_{ij}^k\right|^2\right]}. \quad (20)$$

Step 8: Calculate the relative closeness C_i^+, to the positive ideal alternative for the group. The aggregation of relative closeness for the i-th alternative with respect to the positive ideal alternative for the group can be expressed as:

$$C_i^+ = \frac{d_i^-}{d_i^+ + d_i^-}. \tag{21}$$

where $0 \le C_i^+ \le 1$. The larger the index value is, the better the evaluation of alternative will be.

Step 9: Rank the preference order. A set of alternatives now can be ranked by the descending order of the value of C_i^+.

3. Case study: evaluating and selecting best multi-role artist of rock bands in Iran, based on ANP and TOPSIS grey method

3.1. Criteria selection and data survey

Selecting the best musician or singer always is so hard and always are so complicated especially in Iran, because rock genre is known new genre of music and hasn't old history in this country. The aim of this study is to utilize a new hybrid model of MCDM methods in evaluating and selecting best multi-role artist of rock bands in Iran. We select the most famous artist of rock band which have many fans in Iran as alternatives: Shahram Sharbaf (O-Hum Band) (A_1), Kaveh Afagh (The Ways Band) (A_2), KavehYaghmaei (KavehYaghmaei Band) (A_3) and Erwin Khachikian (Karmandan Band) (A_4). For evaluate these artists we use the criteria that determined in Hashemkhani Zolfani *et al.* (2011b) research. The criteria are shown in table 2.

Table 2- Criteria for selecting best multi-role artist of rock bands in Iran (Hashemkhani Zolfani *et al.* 2011b)

	Criteria
$\otimes x_1$	Song and Songwriting
$\otimes x_2$	Technical Ability
$\otimes x_3$	Innovation
$\otimes x_4$	Ability to singing
$\otimes x_5$	Ideology and behavior
$\otimes x_6$	Ability of composing
$\otimes x_7$	Leadership

1. **Songs and songwriting:** Songwriting is a key to the legacy of any band.
2. **Technical Ability:** Ability of artist to play musical instrument.
3. **Innovation:** The ability to define a genre or a sound or a technique, or to strongly influence bands that came after.
4. **Ability to singing:** Ability of artists to sing. Singers always have been important criteria in success of rock bands.
5. **Ideology and behavior:** Framework of thinking and its appearance in lyrics and general behavior.
6. **Ability of composing:** Direct impact of artist in composing the band.
7. **Leadership:** Impact of artist in keeping group of band together and creating discipline in band.

Based on the nature of seven evaluation criteria, optimization directions for each evaluation criterion is maximize.

Selecting Experts

For this research by considering the limitations 2 academic music instructor were selected from University consist of: 1 PhD and 1 MSc, 13 persons from professional musicians including: 1 pianist, 6 guitarist (3 lead guitars, 1 rhythm guitar, 2 bass guitar), 3 lead vocals, 3 composer and 5 persons for evaluating lyrics including: 4 academic literature and 1 song writers and finally5 persons were selected as experts of contemporary music. The Information about experts is shown in Table 3:

Table 3- Sample knowledge resource nomination worksheet

Skills	Organization and Community
Academic Music Instructor	University
Professional Musicians:	
Pianist	Musicians
Guitarist (Lead, Rhythm, Bass)	& Rock Bands
Vocalist	
Composer	
Literature:	University
Academic Literature Instructor	& Song Writers
Song Writer	
Experts of music (contemporary)	————

3.2. Using ANP method for Prioritization criteria

First, criteria weights were determined by avoiding the interdependence among criteria (Dagdeviren, 2010). To this end, a pairwise comparison matrix was formed and pairwise comparisons were defined by a group of experts, on the basis of Saaty's 1-9 scale.

The pairwise matrix and calculated weights are shown in table 4. The degree of consistency of the pairwise comparison matrix is measured with the use of the consistency ratio (CR) index. It is considered logically consistent if the CR is less than or equal to 0.1. The CR value for this pairwise comparison matrix is 0.095, which is acceptable. At the end of pairwise comparisons, criteria weights were calculated.

Table 4 - The pairwise comparison matrix for criteria

	C_1	C_2	C_3	C_4	C_5	C_6	C_7	Weights
C_1	1	2	2	4	2	7	5	0.295
C_2	1/2	1	2	2	3	3	4	0.200
C_3	1/2	1/2	1	4	3	4	3	0.186
C_4	1/4	1/2	1/4	1	3	3	5	0.127
C_5	1/2	1/3	1/3	1/3	1	5	3	0.145
C_6	1/7	1/3	1/4	1/3	1/5	1	2	0.047
C_7	1/5	1/4	1/3	1/5	1/3	1/2	1	0.040

Next, the group of expert determines the interdependence between the criteria that is presented in Figure 2.

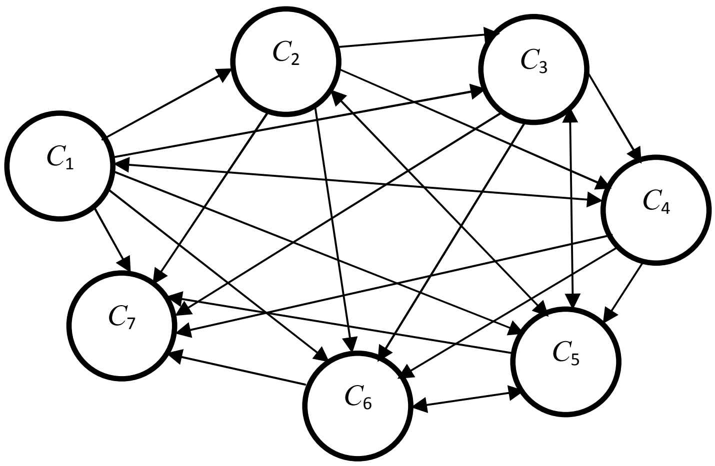

Figure 2 - Dependency among criteria

The normalized eigenvectors matrix of this structure is presented in table 5. A value of “zero” in Table 5 indicates that there is no dependence between two criteria and the numerical values show the relative impact between two criteria.

Table 5: Degree of relative impact for criteria

	C_1	C_2	C_3	C_4	C_5	C_6	C_7
C_1	0.167	0.333	0.231	0.500	0.083	0.250	0.207
C_2	0.000	0.111	0.077	0.100	0.333	0.167	0.172
C_3	0.000	0.000	0.077	0.300	0.083	0.167	0.138
C_4	0.833	0.000	0.000	0.100	0.083	0.125	0.207
C_5	0.000	0.556	0.615	0.000	0.083	0.250	0.207
C_6	0.000	0.000	0.000	0.000	0.333	0.042	0.034
C_7	0.000	0.000	0.000	0.000	0.000	0.000	0.034

w_c calculated by using the data given in tables 4 and 5.

$$w_c = \begin{bmatrix} C_1 \\ C_2 \\ C_3 \\ C_4 \\ C_5 \\ C_6 \\ C_7 \end{bmatrix} = \begin{bmatrix} 0.167 & 0.333 & 0.231 & 0.500 & 0.083 & 0.250 & 0.207 \\ 0 & 0.111 & 0.077 & 0.100 & 0.333 & 0.167 & 0.172 \\ 0 & 0 & 0.077 & 0.300 & 0.083 & 0.167 & 0.138 \\ 0.833 & 0 & 0 & 0.100 & 0.083 & 0.125 & 0.207 \\ 0 & 0.556 & 0.615 & 0 & 0.083 & 0.250 & 0.207 \\ 0 & 0 & 0 & 0 & 0.333 & 0.042 & 0.034 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0.034 \end{bmatrix} \times$$

$$\times \begin{bmatrix} 0.295 \\ 0.200 \\ 0.186 \\ 0.127 \\ 0.145 \\ 0.047 \\ 0.040 \end{bmatrix} = \begin{bmatrix} 0.251 \\ 0.099 \\ 0.075 \\ 0.282 \\ 0.254 \\ 0.034 \\ 0.001 \end{bmatrix}.$$

According to the calculation made C_4, C_5 and C_1 were three of the most important considering criteria.

3.3. Selection of the best artist

Ranking of alternatives by applying TOPSIS grey technique and the weights that are calculated in last stage, is performed.

The initial decision-making matrix with values determined at intervals is presented in Table 6. In Table 6 given notations q_j are the criteria weights and $A_1,\ldots, A_4$ are alternatives. In this table the group of experts evaluated each candidate according to each criterion. The evaluation was done on a scale from 1 to 9, where 9 meant "very important" and 1 "not important at all".

Table 6 - Initial decision-making matrix with values (TOPSIS grey method)

Alternatives	Criteria													
	$\otimes x_1$		$\otimes x_2$		$\otimes x_3$		$\otimes x_4$		$\otimes x_5$		$\otimes x_6$		$\otimes x_7$	
Optimum	max		max		max		max		max		max		max	
A_1	5	6	8	9	7.5	8	7	7.5	7	8	8	9	5	6
A_2	8	9	7	8	8	9	7	8	7.5	8	8	9	7	8
A_3	8	9	8	9	7	8	7.5	8	7.5	8	8	9	7	8
A_4	7	8	7	8	7	8	5	6	7	8.5	8.5	9	6.5	7.5
Optimal value	9		9		9		8		8		9		8	

In Table 7 the normalized decision-making matrix with value of each criterion expressed at intervals is presented. The results of the calculation for each alternative are presented in Table 8.

4. Conclusion

In this study ANP and TOPSIS Grey applied for evaluating of multi-role artists of Iran. The aim of this study was selecting and ranking multi-role artists of rock bands in 2000s. In this research 30 experts participated in process of research in many fields of music. Results of ANP showed importance of criteria and ranked them in summary: 1. Ability to Singing, 2. Ideology and Behavior, 3. Songs and Songwriting, 4. Technical Ability, 5. Innovation, 6. Ability of Composing, 7. Leadership. Four multi-role artists ranked by TOPSIS Grey that Kaveh Yaghmaei selected as a best multi-role artist of rock bands in 2000s in Iran after him Kaveh Afagh selected as a second multi-role and Shahram Sharbaf was third and Erwin Khachikian was last. This study was adopted with Iran situation and there are some important issues that should be discuss here. There isn't any plan for music industry in Iran and this industry isn't profitable for producers and musicians then Leadership criterion isn't important for this model because financial matters life of bands in Iran is to short and bands work together hardly. Life of rock bands in Iran is short and this genre need more time for developing and authors predict that this decade rock genre will find more and more fans in Iran. Finally this study can be useful for international awards like Grammy.

Table 7- Normalized decision-making matrix (TOPSIS grey method)

Alternatives	Normalized values of criteria													
	$\otimes x_1$		$\otimes x_2$		$\otimes x_3$		$\otimes x_4$		$\otimes x_5$		$\otimes x_6$		$\otimes x_7$	
	$\bar{w}_1$	$\bar{b}_1$	$\bar{w}_2$	$\bar{b}_2$	$\bar{w}_3$	$\bar{b}_3$	$\bar{w}_4$	$\bar{b}_4$	$\bar{w}_5$	$\bar{b}_5$	$\bar{w}_6$	$\bar{b}_6$	$\bar{w}_7$	$\bar{b}_7$
Weights q_j	0.251	0.251	0.099	0.099	0.075	0.075	0.282	0.282	0.254	0.254	0.038	0.038	0.001	0.001
A_1	0.555	0.666	0.888	1	0.833	0.888	0.875	0.937	0.875	1	0.888	1	0.625	0.75
A_2	0.888	1	0.777	0.888	0.888	1	0.875	1	0.937	1	0.888	1	0.875	1
A_3	0.888	1	0.888	1	0.777	0.888	0.937	1	0.937	1	0.888	1	0.875	1
A_4	0.777	0.888	0.777	0.888	0.777	0.888	0625	0.75	0.875	0.937	0.944	1	0.812	0.937

Table 8 - Weighted-normalized decision-making matrix (TOPSIS grey method)

Alterna-tives	Weighted-normalized values of criteria																	
	$\otimes x_1$		$\otimes x_2$		$\otimes x_3$		$\otimes x_4$		$\otimes x_5$		$\otimes x_6$		$\otimes x_7$					
	$\bar{w}_1$	$\bar{b}_1$	$\bar{w}_2$	$\bar{b}_2$	$\bar{w}_3$	$\bar{b}_3$	$\bar{w}_4$	$\bar{b}_4$	$\bar{w}_5$	$\bar{b}_5$	$\bar{w}_6$	$\bar{b}_6$	$\bar{w}_7$	$\bar{b}_7$	d^+	d^-	c^+	Rank
A_1	0.139	0.167	0.087	0.099	0.062	0.066	0.246	0.264	0.222	0.254	0.033	0.038	0.0006	0.0007	0.118	0.078	0.738	3
A_2	0.222	0.251	0.076	0.087	0.066	0.075	0.246	0.282	0.237	0.254	0.033	0.038	0.0008	0.001	0.116	0.086	0.827	2
A_3	0.222	0.251	0.087	0.099	0.058	0.066	0.264	0.282	0.237	0.254	0.033	0.038	0.0008	0.001	0.110	0.087	0.863	1
A_4	0.195	0.222	0.076	0.087	0.058	0.066	0.176	0.211	0.222	0.237	0.035	0.038	0.0008	0.0009	0.111	0.069	0.690	4
A^+	0.251	0.139	0.099	0.076	0.075	0.058	0.282	0.176	0.254	0.222	0.038	0.033	0.001	0.0006				
A^-	0.139	0.251	0.076	0.099	0.058	0.075	0.176	0.282	0.222	0.254	0.033	0.038	0.0006	0.001				

According to the TOPSIS grey and the weight that calculated with ANP methods the order of alternatives ranks is: $A_3 \succ A_2 \succ A_1 \succ A_4$. The third alternative is the best artist.

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