Evaluation and ranking the companies of auto and spare parts industry accepted in Tehran Stock Exchange using FAHP and VIKOR

Mohsen Alvandi, Safar Fazli¹, Gholamreza Kordestani², Reza Rezaei³

Corresponding Author email: reza.rezaei8719@gmail.com

ABSTRACT: Financial performance evaluation for manufacturing industry is very critical in comparative environment. So, accurate and proper performance evaluation is very important. As financial performance indicators reflect the competitiveness of a company, they must be indentified accurately in evaluation process. The aim of this research is to propose a model for performance evaluation and ranking the companies of auto and spare parts of accepted in Tehran Stock Exchange. In this study we utilized expert opinions to identify indicators and criteria of financial performance evaluation based on Valued Financial Performance (VFP) and Accounting Financial Performance (AFP). Then a Fuzzy Analytic Hierarchical Process (FAHP) is employed to determine the weights of criteria. In the end to rank the companies, VIKOR methodology is applied.

Keywords: Financial performance evaluation, Delphi technique, FAHP, VIKOR, AFP, VFP

INTRODUCTION

One of the most important financial issues of companies is performance evaluation. Hence investors consider it as a major criterion to choose the company to invest in (Bacidore, et al, 1997).

Traditionally it was common to use accounting information for performance evaluation. Many companies applied some basic accounting variables such as sales, profit, and return on sales (Hiss & Phan, 1991).

Some researchers criticized accounting-based financial performance (AFP) evaluation and in 1990s new methods for evaluation of performance have been introduced. Modern value-based financial performance (VFP) draws attentions to creating value in manufacturing companies. Creating value in companies is the only way they can achieve their major goal of maintaining and increasing shareholders wealth.

Study and investigating the capital market which leads to ranking companies, makes investors to have much safer investment. In developing countries, companies are being ranked by some institutes (Gholizadeh, 2004). In this research, we evaluated companies of auto and spare parts industry of Iran which are accepted in Tehran Stock Exchange using financial criteria based on accounting and value measures. We used fuzzy analytic hierarchy process (FAHP) to determine the weights of criteria. For ranking the companies, VIKOR methodology is employed.

Literature Review

Many studies are focused on performance evaluation of companies, defining relation between financial methods and their impact on performance of companies. Some of them used either AFP or VFP criteria. However they often used both of them. Hall and Brummer (1999) divided evaluation performance criteria into two groups of internal and external evaluation performance criteria. EVA, EPS, and ROA are included in internal evaluation performance criteria in their research. Fernandez (2001) analyze 582 American companies using EVA, MVA, NOPAT, and WACC.

Recently, ranking companies using Multiple Criteria Decision Making (MCDM) have become one of the interesting research areas. Babic and Plazibat (1998) ranked the companies using AHP and PROMETHEE methodologies. Feng and Wang (2000) introduced a performance evaluation process in airlines using some financial proportions. They applied Grey relational analysis to choose criteria and employed TOPSIS methodology to rank 5 best Taiwan airlines. Kahraman (2009) proposed a fuzzy performance evaluation including financial and
non-financial criteria for business banks in Turkey. They applied FAHP and TOPSIS methodologies, simultaneously.

**METHODOLOGY**

In this research, we used both AFP and VFP criteria to evaluate performance of companies. Based on financial expert opinions some indicators determined including Earning Per Share (EPS), Price/Earnings ratio (P/E), and Return On Equity (ROE) as sub-criteria for AFP criteria and Economic Value Added (EVA), Market Value Added (MVA), Cash Value Added (CVA), and Cash Flow Return on Investment (CFROI) are selected for VFP as well. We propose a new financial performance evaluation approach to rank the companies of auto and spare parts industry of Iran. We applied fuzzy analytic hierarchy process (FAHP) to structure criteria and sub-criteria based on AFP and VFP. To rank the companies based on weighted criteria a VIKOR methodology is employed. Note that all analysis presented here include formal data for 2010 through based on Tehran Stock Exchange.

**Financial performance measures**

The measures used in the financial performance evaluation have been attained variety and generality as parallel to the developments in the technology and the perception of a company management. In this study, we used a mixture of AFP and VFP measures.

**Traditional accounting-based financial performance measures**

In this section we used four criteria as traditional accounting measures including ROA, ROE, EPS, and P/E. Explanation of all those are briefed as below.

**Return on Assets (ROA)**

ROA indicates how efficient management uses its resources to make earning. ROA is expected as a percentage and calculated as follows:

\[
ROA = \frac{\text{Net Income Available to Common Stockholders}}{\text{Total Assets}}
\]

**Return on equity (ROE)**

ROE gives an idea how much profitability is generated with the money shareholders have invested. ROE indicates the real cost of spending money and calculated by:

\[
ROE = \frac{\text{Net Income Available to Common Stockholders}}{\text{Stockholder’s Equity}}
\]

**Earnings per share (EPS)**

EPS represent the amount of each outstanding share of a company. EPS is a good way to determine whether a company is growing or not and calculated by:

\[
EPS = \frac{\text{Net Income Available to Shareholders}}{\text{Number of Shares Outstanding}}
\]

**Price earnings ratio (P/E)**

The P/E ratio indicates how much investors are willing to pay per dollar of current earnings. Although there are other important measurement factors which an investor should consider before making an investment decision, P/E ratio is the most popular measure for performance analysis. It is defined as follows:

\[
P/E = \frac{\text{Market Price per Share}}{\text{Earnings per Share}}
\]

**Modern value-based financial performance measures**

In this study, four modern measures are determined as the sub-criteria of the VFP main-criterion to evaluate all the companies of each sector in the auto and spare parts industry of Iran based on expert opinions.
These measures are determined as EVA, MVA, CFROI and CVA. These sub-criteria measures are briefly explained in the following.

**Economic Value Added (EVA)**

Putting forward by Stern Stewart (1991), EVA is established on the basis of enterprise value evaluation theory researched by Franco Modigliani (2005). Introduction of EVA promoted as one of the most interested financial indicators in 1990s. EVA is a measure of residual income, which focuses on the concept that a company must earn an adequate risk adjusted return on its investment in assets.

One way to calculate EVA for any year is to multiply a company’s capital employed at the beginning of the year by the spread between its return on investment capital in the end of the year and its weighted average cost of capital in the end of the year. Under this circumstance, it can be rewritten as follows (Kramer & Pushner, 1997):

\[
EVA = NOPAT - (WACC \times CE)
\]

Where NOPAT is the company’s net operating profit after tax. It deals with the net operational income. WACC is the weighted average cost of capital and represents the minimum income requested by the shareholders or lenders. And, CE is the company’s total invested capital.

**Market Value Added (MVA)**

MVA indicates that how a company successfully utilizes its assets and simultaneously predicts and plan the future profitable opportunities (Jahankhani & zariffard, 1992). MVA is known as the best external measure of management performance in the long term (Ehrbar, 1999). It is calculated as follows:

\[
MVA = \text{Total Market Value} - \text{Total Capital Employed}
\]

**Cash Flow Return on Investment (CFROI)**

Cash Flow Return on Investment (CFROI) as another value-based metric was developed by the Boston Consulting Group and defined as the real cash return on the capital invested in a company as a percentage. This metric indicates one and multi-period internal return ratio of company’s projects (Obrycki & Resends, 2000). It is calculated as follows:

\[
\text{CFROI} = \frac{\text{Sustainable Cash Flows}}{\text{Dollar Gross Investment}}
\]

Where sustainable cash flow is the company’s operating gross cash flows less economic depreciation (ED). ED is the annual investment and gives the company's opportunity cost of funds in order to accumulate a sum equal to the original cost of the depreciable assets at the end of the asset's life. In this sense, assuming an asset life of \( t \) years, ED is computed as follows (Martin & Petty, 2000):

\[
\text{Economic Depreciation} = \frac{wacc}{(1+wacc)^t-1} \times \text{Depreciating Assets}
\]

**Cash Value Added (CVA)**

CVA is a measure of the amount of cash generated by a company through its operations. CVA can be calculated by:

\[
\text{CVA} = \text{Gross Cash Flows (operating)} - \text{Economic Depreciation - Capital Charge}
\]

Where capital charge assigns a cost for the use of all capital the company is using, which is equal to the company's cost of capital times the amount of gross capital invested.

**MCDM METHODS**

MCDM is generally an approach of solving decision problems involving many criteria, factors or objectives. The fundamental characteristics of the goals are that they are often conflicting to one another. MCDM methods find the best alternatives regards to all criteria. Two of the most common MCDM approach is AHP and VIKOR. In this study, we applied fuzzy AHP to determine the weights of criteria. Then VIKOR methodology is employed to rank the alternatives.
Fuzzy Analytic Hierarchy Process (FAHP)

The analytic hierarchy process is one of the popular MCDM methodologies which introduced by Saaty in 1970s. It is being widely used in many fields for a long time. The AHP provides a comprehensive framework for structuring a decision problem with different alternative and criteria. Fuzzy set theory is a powerful tool used to describe an uncertain environment with vagueness, ambiguity or some other type of fuzziness, which appears in many aspects of financial markets, such as the unpredictable behavior of financial managers (Wang & Zhu, 2006). A linguistic variable is a variable whose values are not numbers but words or sentences from a natural or artificial language. Linguistic variables are used to represent the imprecise nature of human cognition when we try to translate people’s opinions into spatial data. The preferences in AHP are essentially human judgments based on human perceptions, so fuzzy approaches allow for a more accurate description of the decision-making process (Chen, et al. 2008).

Chang (1996) proposed a simple method to extend AHP to fuzzy environment. The scales used in FAHP are shown in fig 1.

Fuzzy set theory

In this paper, we use a special type of fuzzy numbers, the triangular fuzzy numbers. A triangular fuzzy number is fully characterized by the triple of real numbers \((l, m, u)\), where \(l < m < u\). The parameter \(m\) gives the maximal grade of the membership function \(\mu_A(x)\) \((i.e., \mu_A(m) = 1)\), and the parameters "\(l\)" and "\(u\)" are the lower and upper bounds of the field of the possible evaluations.

Let \(\tilde{M}_1 = (l_1, m_1, u_1)\), and \(\tilde{M}_2 = (l_2, m_2, u_2)\) be two triangular fuzzy numbers, the basic operations of triangular fuzzy numbers are defined as follows (Kaufmann & Gupta, 1991):

\[
\begin{align*}
\tilde{M}_1 \oplus \tilde{M}_2 &= (l_1 + l_2, m_1 + m_2, u_1 + u_2) \\
\tilde{M}_1 \otimes \tilde{M}_2 &= (l_1 l_2, m_1 m_2, u_1 u_2) \\
\lambda \otimes \tilde{M}_1 &= (\lambda l_1, \lambda m_1, \lambda u_1), \quad \lambda > 0, \lambda \in R \\
M_1^{-1} &\approx (1/u_1, 1/m_1, 1/l_1)
\end{align*}
\]

To evaluate the importance of the VFP and AFP main-criteria and sub-criteria of these main-criteria, it is assumed that the expert group (decision makers) utilize the linguistic weighting set \(W= \{ALI; VSLI; SLI; WLI; EI; WMI; SMI; VSMI; AMI\}\), where ALI: absolutely less important, VSLI: very strongly less important, SLI: strongly less important, WLI: weakly less important, EI: equally important, WMI: weakly more important, SMI: strongly more important, VSMI: very strongly more important, AMI: absolutely more important.
Determining the weights of criteria by FAHP

In this study, the weights of the financial performance criteria are obtained using Chang’s (1992, 1996) extent FAHP method that is because of the computational easiness and efficiency.

\[ S_k = \sum_{j=1}^{n} M_{kj} \times \left[ \sum_{i=1}^{m} \sum_{j=1}^{n} M_{ij} \right]^{-1} \]

According to the method proposed by Chang (1996), the value of the fuzzy synthetic extent is defined, using the standard fuzzy arithmetic, as below:

\[ S_k = \sum_{j=1}^{n} M_{kj} \times \left[ \sum_{i=1}^{m} \sum_{j=1}^{n} M_{ij} \right]^{-1} \]

Where the symbols \( \sum \) and \( \times \) represent the addition and multiplication operations in fuzzy arithmetic, and \( M_{kj} \) is a triangular fuzzy number in which \( k, i \) and \( j \) representing the row number, alternatives, and criteria, respectively. Basically, \( M_{kj} \) is the generic element of a fuzzy pair wise comparison matrix like the one used in the AHP.

As \( M_1 \) and \( M_2 \) are two triangular fuzzy numbers, the degree of possibility of

\[ \text{height}(M_1 \cap M_2) = \frac{u_i - l_2}{(u_i - l_2) + (m_2 - m_i)} \]

\[ V(M_1 \geq M_2) = \begin{cases} 1 & \text{if } m_1 \geq m_2 \\ \text{height}(M_1 \cap M_2) & \text{otherwise} \end{cases} \]

The degree possibility for a convex fuzzy number to be greater than \( k \) convex fuzzy numbers \( M_i (i = 1, 2, \ldots, k) \) can be defined by:

\[ V(M_1 \geq M_2, \ldots, M_k) = V(M_1 \geq M_2), \ldots, V(M_1 \geq M_k) \]

Determining the weights of criteria in pair wise comparison matrix is calculated by:

\[ W'(x_i) = \min\{V(S_i \geq S_k)\}, \quad k = 1, 2, \ldots, n, \quad k \neq i \]

Then the weighted criteria vector is given by:

\[ W'(x_i) = \left[W'(c_1), W'(c_2), \ldots, W'(c_n)\right]^T \quad W_i = \frac{W'_i}{\sum W'_i} \]

The normalized weight vectors via normalization can be obtained via:

Aggregating the data of questionnaire collected from expert group results in one unique questionnaire. Then, regards to formula briefed before the weights of AFP and VFP obtained by FAHP are 0.324, 0.675, respectively. The weights of sub-criteria calculated by the same method are given in table 1.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Sub-criteria</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFP</td>
<td>P/E</td>
<td>0.308</td>
</tr>
<tr>
<td></td>
<td>EPS</td>
<td>0.286</td>
</tr>
<tr>
<td></td>
<td>ROE</td>
<td>0.246</td>
</tr>
<tr>
<td></td>
<td>ROA</td>
<td>0.159</td>
</tr>
<tr>
<td></td>
<td>CVA</td>
<td>0.468</td>
</tr>
<tr>
<td></td>
<td>EVA</td>
<td>0.157</td>
</tr>
<tr>
<td>VFP</td>
<td>CFROI</td>
<td>0.268</td>
</tr>
<tr>
<td></td>
<td>MVA</td>
<td>0.157</td>
</tr>
<tr>
<td></td>
<td>EVA</td>
<td>0.15</td>
</tr>
</tbody>
</table>

All financial measures for all companies obtained from Tehran Stock Exchange. To compare all companies properly we need to homogenize all data used in the analysis. To get data homogenized, we divided provided data by the amount of their assets. Weighted normalized values of financial measure are given in table 2.
Table 2. The weighted normalized values of criteria and sub-criteria

<table>
<thead>
<tr>
<th>Alternatives</th>
<th>ROA</th>
<th>ROE</th>
<th>EPS</th>
<th>P/E</th>
<th>total value AFP</th>
<th>EVA</th>
<th>CVA</th>
<th>MVA</th>
<th>CFROI</th>
<th>total value VFP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bahman Group</td>
<td>0.001156</td>
<td>0.001732</td>
<td>0.002123</td>
<td>0.000929</td>
<td>0.322227879</td>
<td>-0.04249</td>
<td>0.064105</td>
<td>-0.00462</td>
<td>7.7E-05</td>
<td>0.450701</td>
</tr>
<tr>
<td>Pars Khodro</td>
<td>0.000443</td>
<td>0.001183</td>
<td>0.000663</td>
<td>0.005873</td>
<td>0.321270737</td>
<td>-0.00822</td>
<td>0.011875</td>
<td>-0.00055</td>
<td>-0.00055</td>
<td>0.476895</td>
</tr>
<tr>
<td>Sazeh Pouyesh</td>
<td>0.032641</td>
<td>0.098311</td>
<td>0.174578</td>
<td>0.037808</td>
<td>0.176933977</td>
<td>-0.00315</td>
<td>0.13469</td>
<td>-0.00039</td>
<td>0.002316</td>
<td>0.316129</td>
</tr>
<tr>
<td>Zamyad</td>
<td>0.001464</td>
<td>0.003809</td>
<td>0.00466</td>
<td>0.000534</td>
<td>0.320278218</td>
<td>-0.02175</td>
<td>-0.13401</td>
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<td>-6.2E-05</td>
<td>0.6757</td>
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<tr>
<td>Zar Spring MFG</td>
<td>0.012756</td>
<td>0.032874</td>
<td>0.023388</td>
<td>0.082324</td>
<td>0.259613317</td>
<td>2.96E-05</td>
<td>-0.07482</td>
<td>-0.00122</td>
<td>0.000963</td>
<td>0.560517</td>
</tr>
<tr>
<td>Saipa</td>
<td>0.00196</td>
<td>0.000392</td>
<td>0.000366</td>
<td>0.00666</td>
<td>0.324088582</td>
<td>-0.09183</td>
<td>0.125759</td>
<td>0.002137</td>
<td>-8E-05</td>
<td>0.428158</td>
</tr>
<tr>
<td>Electric Khodro</td>
<td>0.009626</td>
<td>0.024122</td>
<td>0.019861</td>
<td>0.012722</td>
<td>0.29622161</td>
<td>-0.00052</td>
<td>-0.08127</td>
<td>-0.00201</td>
<td>-0.00695</td>
<td>0.579238</td>
</tr>
<tr>
<td>Shargh</td>
<td>0.02862</td>
<td>0.049195</td>
<td>0.032106</td>
<td>0.018818</td>
<td>0.23059004</td>
<td>-0.00027</td>
<td>0.00881</td>
<td>0.15656</td>
<td>0.002565</td>
<td>0.271175</td>
</tr>
<tr>
<td>Khavar Spring</td>
<td>0.000447</td>
<td>0.001118</td>
<td>0.109003</td>
<td>0.091261</td>
<td>0.241363018</td>
<td>-0.00013</td>
<td>0.10288</td>
<td>-0.00298</td>
<td>-0.0077</td>
<td>0.361296</td>
</tr>
<tr>
<td>Manufacturing</td>
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<td>0.013415</td>
<td>0.016672</td>
<td>0.018024</td>
<td>0.301550104</td>
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<td>0.030102</td>
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<td>Vanmo</td>
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<td>0.000776</td>
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<tr>
<td>Nasir Machine</td>
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<td>0.202489</td>
<td>0.188351</td>
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<td>0.0</td>
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<tr>
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<td>0.000217</td>
<td>0.3243</td>
<td>-0.01514</td>
<td>-0.02032</td>
<td>-0.00063</td>
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<tr>
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<td>0.00099</td>
<td>0.010241</td>
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<td>0.291493719</td>
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<td>Iran Tractor Foundy</td>
<td>0.003427</td>
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<td>0.006983</td>
<td>0.051273</td>
<td>0.29525246</td>
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<td>Mashad Wheel MFG</td>
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<td>0.011076</td>
<td>-0.00252</td>
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<td>Iran Auto Spares</td>
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<td>0.051757</td>
<td>0.047165</td>
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<td>0.247130079</td>
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<td>-0.04134</td>
<td>0.004095</td>
<td>0.003776</td>
<td>0.513125</td>
</tr>
</tbody>
</table>

RANKING THE ALTERNATIVES USING VIKOR METHODOLOGY

VIKOR is one of the multiple criteria decision making (MCDM) models to determine the preference ranking from a set of alternatives in the presence of conflicting criteria. The justification of VIKOR is to use the concept of the compromise programming to determine the preference ranking by the results of the individual and group regrets. VIKOR first introduced by Yu (1973) and Zeleny (1982). In this method, the various \( j \) alternatives are denoted as \( a_1, a_2, \ldots, a_j \). For an alternative \( a_j \), the multiple attribute merit for compromise ranking was developed from the LP-metric used in the compromise programming method (Zeleny, 1982).

\[
L_{pi} = \left( \sum_{j=1}^{n} w_i (f_j^* - f_{ij}^-) / (f_j^* - f_{ij}^-) \right)^{1/p}
\]

where 1 ≤ \( p \) ≤ +∞; \( i = 1, 2, \ldots I \).

\( L_{pi} \) and \( L_{wj,i} \) are used to formulate the ranking measures. The solution obtained by \( \min_j S_j \) is with a maximum group utility ("majority" rule), and the solution obtained by \( \min_j R_j \) is with a minimum individual regret of the "opponent".

The main steps of the VIKOR method are described as follows:

Step 1. Determine the best \( f_j^* \) and the worst \( f_j^- \) values of all criterion functions assuming that jth function represent a benefit:

\( f_j^* = \max f_{ij} \)

\( f_j^- = \min f_{ij} \)

\( i = 1, 2, \ldots, m, j = 1, 2, \ldots, n \)

Step 2. Compute the values \( S_i \) and \( R_i ; i = 1, 2, \ldots i \), by the relations:

\[
S_i = \sum_{j=1}^{n} w_i (f_j^* - f_{ij}^-) / (f_j^* - f_{ij}^-)
\]
\[ R_i = \text{Max} \left[ w_i (f^*_j - f^-_j) / (f^*_j - f^-_j) \right] \]

Where \( W_i \) are the weights of criteria, expressing their relative importance.

Step 3. Compute the values \( Q_i, i = 1, 2, \ldots, i \), by the relation

\[ Q_i = v \left[ \frac{S^- - S^*}{S^- - S^*} \right] + (1-v) \left[ \frac{R^- - R^*}{R^- - R^*} \right] \]

Where \( S^* = \text{Min} S_i, S^- = \text{Max} S_i \), and \( R^* = \text{Min} R_i, R^- = \text{Max} R_i \). \( v \) is introduced as weight of the strategy of “the majority of criteria” (or “the maximum group utility”) and usually \( v = 0.5 \).

Step 4. Rank the alternatives, sorting by the crisp values in decreasing order. The results are three ranking lists by S, R, and Q, respectively.

Step 5. Propose a compromise solution the alternative \( A^{(1)} \), which is the best-ranked solution by the measure \( Q \) if the following two conditions are satisfied:

C1: Acceptable advantage: \( Q(A^{(2)}) - Q(A^{(1)}) \geq \frac{1}{j-1} \), where \( A^{(2)} \) is the alternative with second position in the ranking list by \( Q \); \( j \) is the number of alternatives.

C2: Acceptable stability in decision making: Alternative \( A^{(1)} \) must also be the best ranked by \( S \) or \( R \).

If one of the conditions is not satisfied, then a set of compromise solutions is proposed, which consists of:

CS1: Alternatives \( A^{(1)} \) and \( A^{(2)} \) if only condition C2 is not satisfied, or

CS2: Alternatives \( A^{(1)}, A^{(2)}, \ldots, A^{(j)} \) if condition C1 is not satisfied; \( A^{(j)} \) is determined by the relation

\[ Q(A^{(j)}) - Q(A^{(1)}) < \frac{1}{j-1} \]. The positions of these alternatives are “in closeness”.

After calculating the total values of the main-criteria, companies of the auto and spare parts industry of Iran are ranked using VIKOR method. The alternatives are ranked by sorting \( S_i, R_i \) and \( Q_i \) values in an increasing order in the VIKOR method. In Table 3, companies of the auto and spare parts are ranked respect to VIKOR method. As seen in this table, the best ranked company for the auto and spare parts industry is Khavar Spring Manufacturing Co. This company is proposed as a compromise solution because the two conditions (C1 and C2) are satisfied. Given these results, KERVAT has an acceptable advantage; in other words \( Q_{(2)} - Q_{(1)} = 0.130777 \geq \frac{1}{j-1} = 0.05263 \) And, Khavar Spring Manufacturing Co. is also stable within the decision-making process; in other words it is also the best ranked by \( S_i \) and \( R_i \). Because the two conditions are satisfied together, the alternative Khavar Spring Manufacturing Co. is proposed as a compromise solution.

CONCLUSION

Performance evaluation of companies in a comparative manner especially in same industry will help managers to get a better view over their comparative environment. In this study we proposed an approach to evaluate the companies of auto and spare parts industry of Iran using MCDM methods based on financial performance measures. In the proposed method traditional and modern financial performance measures based on expert opinions have been utilized. We applied FAHP to determine the weights of criteria and sub-criteria. VIKOR methodology is employed to rank the companies. For future research investigating different industries with different criteria including non-financial measures such as innovating, production efficiency, and customer satisfaction using other MCDM approaches is recommended.
Table 3. Ranking of the companies of Auto and Spare parts industry of Iran

<table>
<thead>
<tr>
<th>Alternatives</th>
<th>S</th>
<th>Ranking</th>
<th>R</th>
<th>Ranking</th>
<th>Q</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bahman Group</td>
<td>0.772929</td>
<td>12</td>
<td>0.450701</td>
<td>9</td>
<td>0.564517</td>
<td>10</td>
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<tr>
<td>Pars Khodro</td>
<td>0.789156</td>
<td>13</td>
<td>0.467885</td>
<td>10</td>
<td>0.597206</td>
<td>12</td>
</tr>
<tr>
<td>Sazeh Poushey</td>
<td>0.493063</td>
<td>4</td>
<td>0.316129</td>
<td>5</td>
<td>0.200715</td>
<td>4</td>
</tr>
<tr>
<td>Zamyad</td>
<td>0.995978</td>
<td>20</td>
<td>0.6757</td>
<td>20</td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>Zar Spring MFG</td>
<td>0.82013</td>
<td>15</td>
<td>0.560517</td>
<td>18</td>
<td>0.733555</td>
<td>18</td>
</tr>
<tr>
<td>Saipa</td>
<td>0.752246</td>
<td>9</td>
<td>0.428158</td>
<td>7</td>
<td>0.52206</td>
<td>8</td>
</tr>
<tr>
<td>Electric Khodro Shargh</td>
<td>0.875459</td>
<td>19</td>
<td>0.579238</td>
<td>19</td>
<td>0.795735</td>
<td>19</td>
</tr>
<tr>
<td>Khavar Spring Manufacturing</td>
<td>0.501766</td>
<td>5</td>
<td>0.271175</td>
<td>1</td>
<td>0.151292</td>
<td>3</td>
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<tr>
<td>Iran Carburetter</td>
<td>0.602656</td>
<td>7</td>
<td>0.361296</td>
<td>6</td>
<td>0.333868</td>
<td>6</td>
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<tr>
<td>Niroo Mohareke</td>
<td>0.738788</td>
<td>8</td>
<td>0.437238</td>
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<td>0.523787</td>
<td>9</td>
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<tr>
<td>Vamco</td>
<td>0.799258</td>
<td>14</td>
<td>0.505535</td>
<td>13</td>
<td>0.650871</td>
<td>14</td>
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<tr>
<td>Mehrkam Pars</td>
<td>0.443937</td>
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<td>0.303754</td>
<td>4</td>
<td>0.150756</td>
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<tr>
<td>Nasir Machine</td>
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<td>0.487011</td>
<td>12</td>
<td>0.407657</td>
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<tr>
<td>Iran Khodro</td>
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<td>0.514023</td>
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<tr>
<td>Mehvarsazan</td>
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<td>0.548632</td>
<td>17</td>
<td>0.731988</td>
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<tr>
<td>Charkheshgar</td>
<td>0.826201</td>
<td>16</td>
<td>0.534708</td>
<td>16</td>
<td>0.705939</td>
<td>16</td>
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<tr>
<td>Iran Tractor Foundry</td>
<td>0.532331</td>
<td>6</td>
<td>0.295252</td>
<td>3</td>
<td>0.202618</td>
<td>5</td>
</tr>
<tr>
<td>Mashad Wheel MFG</td>
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<td>0.287345</td>
<td>2</td>
<td>0.019986</td>
<td>1</td>
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<td>Iran Radiator</td>
<td>0.753676</td>
<td>10</td>
<td>0.4751</td>
<td>11</td>
<td>0.58109</td>
<td>11</td>
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<tr>
<td>Iran Auto Spares</td>
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<td>11</td>
<td>0.513125</td>
<td>14</td>
<td>0.632732</td>
<td>13</td>
</tr>
</tbody>
</table>

REFERENCES


