Prioritization of Key Success Factors of Listed Companies in Tehran Stock Exchange Using Fuzzy Analytical Hierarchy Process (Case Study: Financial Institutions)

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ABSTRACT

The purpose of this study was to evaluate the prioritization of key success factors of listed companies in Tehran stock exchange using fuzzy analytical hierarchy process. The sample for this study is included financial companies listed on the Tehran stock Exchange. Accordingly, while reviewing the relevant literature, the Stock Exchange of experts and expert's province has responded to a questionnaire designed to evaluate the significance of the coefficient. The collected data and information requirements refer to the Financial Instruments and Exchange Organization amazing new software approach to the rank of listed companies was discussed. According to the results, it can be said that among the factors used in the study, factors related to customer in finance and to the rank of listed companies was discussed. The AHP technique will reduce the complexity of decisions applying paired comparisons (one-to-one) and combining the outcomes. Accordingly, it helps the decision-makers to arrive at the best decision and presents a rational and clear justification that is

INTRODUCTION

Economic development in the world, especially since the twentieth century, are owes the stock exchange and capital market activities. Capital market in the form of a financial market is the confluence of supply and demand for medium- and long-term financial resources. Most suppliers of capital in this market are individual savings, the legal person savings, organizations, government and credit agencies. This market as a centre for the providing capital funds, savings and liquidity, leads persons through brokers and financial intermediaries to behalf of long-term investments for production and commerce [14]. Developing and attraction the capital will not alone lead to economic development. But this would be achieved if this funds investment in successful companies and the economy with comparative advantage. Successful companies with high quality products and value-added activities, will increase GDP and export, this will lead to economic growth and increase exchange rate. Investment in this company would be optimal allocation of capital. Therefore recognition of won and successful companies can be important in the capital market and the stock exchange (Belton and Steward, 2002). Key factors for success as a top-down approach methodology are used for organizations strategic planning; because several factors can be identified the required information to be marked to show the organization's top management. In addition, if the key success factors determine and control, management can take certain steps to take to improve their potential [16]. By taking the difference between successful and unsuccessful companies listed, study to review and prioritize the key success factors in Tehran Stock Exchange listed companies using the techniques of fuzzy analytic hierarchy (AHP) has been investigated.

Literature Review:

The analytical hierarchy process (AHP) method presented by Tomas L. Saati is one of the best known and most practical multi-criteria decision-making models. This model is used when it is required to consider quantitative and qualitative aspects of the decision simultaneously [1]. The AHP technique will reduce the complexity of decisions applying paired comparisons (one-to-one) and combining the outcomes. Accordingly, it helps the decision-makers to arrive at the best decision and presents a rational and clear justification that is

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indicative of being the best decision [1]. Within the AHP context, the decision maker cannot provide
deterministic preferences and uses perception-based judgment intervals instead. This kind of uncertainty in
preferences can be modeled using fuzzy set theory. The fuzzy set theory approach could resemble human
reasoning in the use of approximate information and uncertainty to generate decisions [2]. In the fuzzy set
terminology, the ratio supplied by the decision maker is a fuzzy number described by a membership function.
Here, a membership function describes the degree with which elements in the judgment interval belong to the
preference set. Fuzzy AHP consists of deriving the local priorities from these fuzzy preference ratios, which are
subsequently aggregated to form the global priorities. The fuzzy AHP computes fuzzy priorities based on
arithmetic operations for fuzzy triangular (or trapezoidal) numbers. This method has the ability to capture the
vagueness of human thinking style and effectively solve multi-criteria decision making problems [3].

Wang [5] had also evaluated financial performance of domestic airlines in Taiwan with fuzzy TOPSIS
method. Talluri and Narasimhan [6] have done on vendor evaluation with performance variability. Ertugrul and
Karakasoglu [8] developed a model for evaluating performance of Turkish cement companies. Zavadskas and
Turkis [7] had performed investigations on “MCDM” Methods in Economics. Sheu [10] developed an
integrating model (Fuzzy-AHP and Fuzzy –TOPSIS), to choice mode of global logistics. Aydogan [9] proposed
Performance measurement model for Turkish aviation firms using the rough-AHP and TOPSIS methods under
fuzzy environment. Moreover a fuzzy model combining FAHP and TOPSIS was used to evaluate the
performance of eight Cement companies using financial ratios [11]. In addition, combining of non-economic
elements and economic factors via using a FAHP approach by several researchers [12,13].

Teriyaki has used the FAHP method for portfolio selection. In this study, the model is based on the two
models presented by Enea and Pieza and the population of the study is the Istanbul Stock Exchange. According
to the results of this study, both of the methods applied delivered the same data to the investors for ranking and
weighing through the FAHP method. Moreover, advantages and disadvantages of these two methods have been
compared.

MATERIAL AND METHODS

This study is a descriptive study and in terms of purpose, is an applied research. The sample for this study is
included financial institutions listed on the Tehran Stock Exchange.

In present research, for the purpose of ranking based on financial ratios, a questionnaire was composed by
means of which weight of financial ratio in the ranking is obtained. Once the questionnaire’s validity has been
confirmed, its reliability using inconsistency rate was found to be 0.06 which was smaller than 0.1 and
hence approved. Next, the questionnaire was handed out to 20 experts and respective officials of the capital
market as well as professors of finance and accounting from various universities and they were asked to give
their opinion on the question as to what extent each one of the financial ratios should be considered as a critical
indicator in firms ranking. Given the type, purpose, hypotheses and questionnaire of the research, a 1-to-9-hour
scale was employed to form the matrix of paired comparisons in order to evaluate weight of the indicators and to
rank companies using AHP and TOPSIS techniques. In the next step, using AHP technique and Expert Choice
software, the indicators were assigned weight and then profiting from TOPSIS technique under TOPSIS
software the firms were ranked. To assign weight and generalize experts’ view on the four understudy financial
criteria (financial ratios), AHP technique was employed. In this technique, after construction of the model and
development of the decision tree (hierarchy structure), the matrix of paired comparisons for indicators which
represents significance and priority of the index i relative to index j was formed and subsequently de-scaled.

Following this process, to apply TOPSIS technique to ranking of the companies based on each one of the
financial ratios and choice of the best option from among the available options, first, decision making matrix is
formed and using entropy weight assignment method the indicators are assigned a weight. To de-scale the
indicators’ measurement units and to allow algebraic operation on them, each element of decision matrix using
relation 3 is standardized and finally the de-scaled matrix is built.

\[ r_{ij} = \frac{a_{ij}}{\sum_{l=1}^{n} a_{lj}} \]  

Result:

Normalised data with weighted means based on customer, organization resource and competition indices showed
in table 1, 2 and 3, respectively.

<table>
<thead>
<tr>
<th>Customer</th>
<th>Requirements</th>
<th>Trends</th>
<th>weighted means</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements</td>
<td>0.6719</td>
<td>0.6719</td>
<td>0.6719</td>
</tr>
<tr>
<td>Trends</td>
<td>0.3281</td>
<td>0.3281</td>
<td>0.3281</td>
</tr>
</tbody>
</table>
Table 2: Normalised data with weighted means based on organization resource index.

<table>
<thead>
<tr>
<th>Enterprise resource</th>
<th>Abilities</th>
<th>Assets</th>
<th>Culture</th>
<th>weighted means</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abilities</td>
<td>0.7189</td>
<td>0.7357</td>
<td>0.6929</td>
<td>0.7159</td>
</tr>
<tr>
<td>Assets</td>
<td>0.1606</td>
<td>0.1643</td>
<td>0.1909</td>
<td>0.1719</td>
</tr>
<tr>
<td>Culture</td>
<td>0.1205</td>
<td>0.1000</td>
<td>0.1161</td>
<td>0.1122</td>
</tr>
</tbody>
</table>

Table 3: Normalised data with weighted means based on competition index.

<table>
<thead>
<tr>
<th>Competition</th>
<th>Weaknesses</th>
<th>Vulnerabilities</th>
<th>weighted means</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weaknesses</td>
<td>0.7563</td>
<td>0.7563</td>
<td>0.7563</td>
</tr>
<tr>
<td>Vulnerabilities</td>
<td>0.2437</td>
<td>0.2437</td>
<td>0.2437</td>
</tr>
</tbody>
</table>

Based on calculated data, normalised scores of indices are ranked and showed in table 5.

Table 5: Normalised scores of indices.

<table>
<thead>
<tr>
<th>Variables</th>
<th>weight</th>
<th>Rank</th>
<th>weight</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements</td>
<td>0.6719</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trends</td>
<td>0.3281</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weaknesses</td>
<td>0.7563</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abilities</td>
<td>0.7159</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vulnerabilities</td>
<td>0.2437</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assets</td>
<td>0.1719</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Culture</td>
<td>0.1122</td>
<td>7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion and Conclusion:

According to the results, it can be said that among the factors used in the study, factors related to consumer in finance and credit institutions listed is the success of the more impact. Weakness index and the ability to have more influence and culture are less effective, this result are consistent with research Jalalyan et al [17], Hanafizadeh and Ghafore, and Chen and Wang [13]. In modern era, the economic rules of production, supply and demand to policy and strategic direction of the companies takes place in dimension the worldwide. Economic and social life becomes ever more global and non-governmental, and regardless of this new and important dimension, cannot be perceived to be the most crucial aspects of human life. New logic solely constructed on the basis of customer. No matter that customer where in the world and live and how the customer thinks. It is important to provide orientation and views available to everyone around the world and whatever companies to achieve this goal are more successful. Due to the uncertainity in most cases making use of multi-criteria decision-making techniques to overcome this uncertainity, the researchers suggested. Application of multi-criteria decision techniques in financial analysis, due to the uncertainity in the market can help decision makers make better decisions. Using this technique can be many variables, but the mathematical aspects are important in the decision to be involved in decision-making this will increase consumer satisfaction.

REFERENCES


