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Evaluation and selection of suppliers using network analysis process and VIKOR methods

Mohammad Reza Jafari*

Department of Industrial Engineering, Payame Noor University, Tehran, Iran

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Abstract

Today, due to widespread competition and the presence of interconnected manufacturing environments, supplier performance is an effective factor in the success or failure of companies. The decision to select a supplier is also an important factor in the production and support management of many companies. The supply chain has a special and important position in the strategic management literature. The supply chain is referred to activities related to suppliers of raw materials or services and consumers or customers and producers of the product or the service itself. Evaluation and selection of suppliers is one of the key elements in industrial purchase processes and seems to be one of the main activities of specialized industries. Selecting suppliers is multi-criteria decision-making. To solve this problem, several methods have been proposed in the theoretical literature of the study. This paper presents a conceptual framework for selecting the best supplier by considering several criteria. The proposed framework includes the weights obtained for the criteria by the network analysis process method. Also, by identifying the effective quantitative and qualitative criteria in suppliers' prioritization in the supply chain, the integrated VIKOR-ANP approach is used to provide a method to prioritize suppliers in the supply chain with a combination of qualitative and quantitative criteria. The ANP method is used to evaluate the alternatives to the quality criteria and to obtain the relative weight of the criteria and the VIKOR is used for the final ranking of the alternatives.

Keywords: Strategic management, Suppliers selection, Network analysis method, VIKOR analysis
2020 MSC: 68V30

1 Introduction

Due to the activities specialization in today's world, many offers are presented from suppliers to the organization for the purchase of the minimal requirements of the organization. In this process, a particular person or organization is selected from among the suppliers [30]. The supplier selection is a multi-criteria decision-making issue that includes both quantitative and qualitative criteria. The selection of the right suppliers can significantly reduce purchase costs and increase the organization's competitiveness [19]. Selecting the suitable supplier is one of the most important issues in the supply chain of organizations. Indeed, selecting the appropriate supplier is a key element to achieve the best quality, instead of the right price, the required level of technical support and the desired service level [1].

The supplier evaluation and selection is one of the strategic issues and is considered as the main supply chain. What justifies the philosophy of supply chain creation is the integration of the elements of the chain with the purpose of

*Corresponding author
Email address: jafari_mohammadreza@yahoo.com (Mohammad Reza Jafari)

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creating more value and achieving a competitive advantage. This integration which is based on strategic cooperation, ensures the long-term advantages of the chain elements and emphasizes on a win-win relationship. This attitude has changed the traditional form of supplier evaluation and the supplier is not evaluated merely in terms of a competitor [7].

Briefly, the supplier selection issues can be defined in six categories. These six groups are:

- Number and type of objectives / selection criteria (one or multi- objectives)
- The required period (one period or several periods)
- Number of parts / raw materials for outsourcing / supply (one or more parts)
- Discount strategy / Delay payment
- Certainty or uncertainty of variables and factors
- Single-source / multi-source selection system (selection of one or more suppliers) [18].

2 Research Significance

During 1960 and 1970, companies were obliged to improve the details of their market strategies, which focused on customer creation, capture, and retention. They should also participate in the management of the network of all the companies before them providing inputs (indirectly and directly) and the network of companies after them that provide delivery and after-sales services. Thus, the concept of "supply chain" was emerged [39]. Supply chain management is a process in which the activities of suppliers are organized in such a way that the demands required by the company are met quickly, efficiently and with high quality [24]. Supply chain management is a comprehensive philosophy to manage the distribution channels flow from supplier to consumer. Supply chain management provides a means for the continuous exchange of information and the improvement of the organization's performance. Supply chain management helps the organizations obtain technical knowledge [3].

According to research, one of the most basic steps in supply chain management is to reduce suppliers. This has the following benefits to manufacturers:

- Reduce the cost of the total product produced
- Purchase from the best suppliers
- Use all the facilities of suppliers
- Lower cost of supplier management and the ability to use advanced buying policies
- Capability to develop suppliers [32, 33].

Buying activity as a competitive capability is one of the most important activities of the supply chain. Due to the crucial role of suppliers in the quality of the final product and finally customer satisfaction, organizations evaluate the performance of their suppliers on periodically. As indicated by the researches, by periodical evaluation of the existing suppliers, organizations, lose their chance to choose the best supplier in 50% of cases. Due to the presence of different indicators to evaluate suppliers at different periods, simultaneous evaluation of current and new suppliers has always been a challenge for organizations. For example, some indicators including timely delivery and quality of shipments, which are the main dimensions of quality, can only be used to evaluate the current suppliers of organizations and cannot be used for new suppliers due to lack of information and this may make it difficult to compare suppliers simultaneously.

Another important problem in evaluating suppliers is the dependence of the decision-maker's judgment on experience, in which with increasing the number of suppliers, the judgment uniformity in decision-making is reduced and the errors are increased [48].

The process of evaluating and selecting suppliers includes several indicators and criteria that should be taken into consideration. Hence, the process can be easily included into a multi-criteria decision-making model by considering tangible and intangible criteria. In the supplier evaluation phase, after the pre-qualification models and qualitative models, multi-criteria models are used. These models are based on multi-objective optimization [13, 45], data envelopment analysis method [22, 44], hierarchical analysis process [21] and simple multi-criteria ranking method [41].

3 Research background

In a study, Alian [5] used an integrated approach of network analysis process and the VIKOR method in a fuzzy environment to rank and select suppliers in Soroush Tabarestan audiometry firm. In the research, he used the process of fuzzy network analysis to obtain the weights of criteria and the fuzzy Victor method was used to prioritize suppliers. He selected four criteria of quality, price, delivery time and communication as evaluation criteria using the opinion of experts as well as reviewing the research literature. Finally, the findings of the study indicated gaining the top rank by Alton Company.

In their paper, Pouya and Zavarem [29] solved the supplier selection problem using a fuzzy Delphi-VIKOR hierarchical analysis model. The research was conducted in the Barfdane mineral water Company. Two questionnaires were distributed for this purpose. The first questionnaire was used to obtain the weights of criteria and, three suppliers were prioritized using the fuzzy VIKOR method in the second questionnaire. The statistical population of the study was 6 experts of the company. The criteria identified and approved for the research were 6 criteria including: quality, price, flexibility in payment method, production facilities and capacity, timely delivery and position in the industry. Finally, quality criterion with a weight of 0.254 was selected as the most important criterion and then price variable with a weight of 0.237 was selected as the second priority.

Meysam Azimian et al. [8] in his papers presented an integrated approach of multi-criteria decision making with the analysis of error tree, to select the best combination of strategic product suppliers in Subsea Research and Development Center. First, by determining the evaluation indicators and determining the position of the suppliers to the indicators, the risk of each supplier is estimated. In addition, the inherent risk of the equipment used in the product has been qualitatively estimated and the final integrated risk of equipment has been obtained based on different supply scenarios. Then, by determining the occurring events for the product and using the analysis of error tree, the best composition of the suppliers of equipment is selected among different scenarios. The novelty of this study is presenting an integrated approach of decision making with the multiple criteria and the error tree analysis to determine the right suppliers to reduce the final risk of a product.

In a study, Luthra et al. [23] evaluated and developed a framework to evaluate and select green suppliers in the supply chain. In this method, hierarchical analysis method is used to obtain the weights of criteria and the VIKOR method is used to rank the options. The research was performed in India. 22 suppliers were selected for this purpose. It was found that the hybrid model used to evaluate and select suppliers is of high quality.

In their paper, Cristea and Cristea [12] used multi-criteria decision-making methods to evaluate and select suppliers in the packaging industry. In this research, ELECTRE 3 method has been used for evaluation and selection.

In most studies on providing sources, supplier selection is considered as a multiple- criteria decision-making problem in which besides price, other quantitative and qualitative criteria are included in the evaluation process. The multiplicity and heterogeneity of criteria sometimes complicates this problem; thus, we need some techniques to help the decision maker in selecting the best supplier (suppliers) by balancing different and sometimes contradictory criteria. The model in this research is an integrated model consisting of two techniques of network analysis and the VIKOR method. The combination of these two methods has provided a powerful tool to support the supplier selection process. This integrated approach examines the relationships between the criteria for the selection of suppliers and finally, the results of this study are presented with a practical example.

4 Research questions

In the present study, we attempt to find a suitable answer to the following questions:

1. What are the most important indicators in evaluating the performance of suppliers?
2. What are the most important methods of performance evaluation? Do these methods have all the dimensions for suitable evaluation?
3. Is it possible to close the existing gaps and develop a suitable model for evaluation by using the integrated method of hierarchical analysis and the VIKOR method?

According to the given questions, the most important purpose of the present study is to provide an integrated method to evaluate and select suppliers in the supply chain.

5 Research methodology

Multiple-criteria decision making is a mathematical model and refers to a problem-solving approach that is used to select an alternative from a limited number of alternatives [31]. Multiple-criteria decision-making methods are famous for ease of use, hybrid methods (if combined properly) can retain these strengths and create multiple sources of knowledge and experience [38].

Thus, in order to achieve more efficient decisions, the present study has used a combination of two approaches of network analysis and the VIKOR method, which compensate the weaknesses of each with the strengths of the other one. The network analysis process model is an advanced model to construct and analyze decision making. This model is capable to calculate the consistency of judgments and flexibility in the number of judgment criteria levels [16].

5.1 Statistical population and sampling method

The statistical population of the present study consists of the total number of employees in the tender, contract management and marketing sections of the company as 12 individuals based on employment information. Due to the limited volume of the statistical population, the census method (counting) has been used instead of sampling method.

5.2 Reliability and validity

In the present study, in order to increase the validity and reliability of the questionnaire, the initial design of the questionnaire was prepared and reviewed by relevant experts before being distributed among the statistical population. So, some items were suggested for correction and after the applying the corrections, the final questionnaire was developed. Also, to measure the reliability, the standard method provided by Saaty "the inconsistency rate" has been used. According to Equation (5.1), if the inconsistency rate in the network analysis method is less than 0.1, we can trust the pairwise comparison data.

In the present study, this rate is less than 0.1 for all parts of the questionnaire, which indicates the good reliability of the questionnaire.

$$C = \sum_{control\ criteria} K_c \sum_{(All\ chains)} (\sum_{j=1}^{h} \sum_{i=1}^{ni_{j+1}} w_{ij}\mu_{ij+1}) + \sum_{control\ criteria} K_c \sum_{j=1}^{n_k} w_{ik} \sum_{h=1}^{|c_h|} w_{(k)(h)}\mu_k(j,h) \tag{5.1}$$

Where n_j is the number of elements in j^{th} level of the hierarchy and $j = 1, 2, ..., h$ is the number of levels of the hierarchy. w_{ij} is the i^{th} standard weight at the j^{th} hierarchy level. ni_{j+1} is the number of $j + 1^{th}$ elements of the hierarchy which are compared pairwise in relation to the i^{th} criterion of the j^{th} level of the hierarchy. The importance of hierarchical analysis method, besides combining different levels of hierarchy, is the decision making and consideration of various factors in calculating the rate of inconsistency. Inconsistency rate is a mechanism that determines the consistency of comparisons. This mechanism determines the extent to which group members' preferences can be trusted.

5.3 Data analysis method

5.3.1 Network analysis process

Thomas L. Saaty, as one of the pioneers in network analysis method, has presented various scientific works, and his works are used as a source of researches on network analysis around the world. This analysis method was famous mostly with the publication of a book "Fundamentals of the network analysis process [35]. Network analysis method is a mathematical theory that systematically considers various dependencies and is successfully used in various fields [6]. The network analysis process is a new theory that develops the hierarchical analysis process to evaluate the dependence on feedback and for these purposes, uses the supermatrix approach. Although both the network analysis process and the hierarchical analysis process apply priorities by performing pairwise comparisons, there are some differences between them. The first difference is that the hierarchical analysis process is a special form of the network analysis process, because the network analysis process considers intra-cluster dependence (internal dependence) and inter-cluster dependence (external dependence). The second difference is that the network analysis process has a nonlinear structure. In general, the hierarchical analysis process model is a decision-making framework that assumes a one-way and hierarchical relationship between the levels of decision. Instead, the network analysis process does not require this strict hierarchical and vertical structure [4].

The network analysis method is presented based on human brain analysis for complex and fuzzy problems with non-class structure and in order to modify the hierarchical analysis method. In this method, after making a non-class structure and determining the logical relationship between different levels of decision, the existing structure is divided into N subsets and then a judgment matrix is formed for the feedback system via pairwise comparisons. For this purpose, first, it is necessary to form a matrix of pairwise comparisons by comparing the criteria and sub-criteria as paired. Then, in order to evaluate the consistency and reliability of the decisions, the consistency ratio (CR) of each matrix is calculated according to Equation (5.2) as presented by [34]:

$$CR = \frac{CI}{RI} \tag{5.2}$$

Where CI is the index of the pairwise comparison matrix and is measured by the principle eigenvector ($\lambda_{\max}$) and its dimension (n) as shown in Equation (5.3):

$$CI = \frac{\lambda_{\max} - n}{n-1} \tag{5.3}$$

The RI parameter is also extracted as a random index by Table 1:

Table 1: Corresponding values for the RI index based on the matrix dimension

Dimension (n)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
RI	0	0	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.49	1.51	1.48	1.56	1.57	1.59

Therefore, if the consistency rate is less than 0.1, the consistency criterion is obtained, otherwise it is required to revise the pairwise comparison of the criteria. After ensuring the consistency of the pairwise comparison matrices, the weight of each element in each subgroup is determined. The eigenvector technique is one of the appropriate methods in this field, in which the weight of each element is obtained by Equation (5.4):

$$w_i = \frac{1}{\lambda_{\max}} \sum_{i=1}^{n} a_{ij} w_j \tag{5.4}$$

Where ($\lambda_{\max}$) is the principle eigenvector and a_{ij} is the elements of the pairwise comparison matrix.

Thus, if ni denotes the number of elements of the Si set, (W_{ik}^{jl}) indicates the weight of the k^{th} element from the i^{th} subset compared to the l^{th} element from the j^{th} subset, then the judgment matrix for the elements of the i^{th} subset regarding the elements from the j^{th} subset is written as equation (5.5):

$$W_{ij} = \begin{bmatrix} W_{i1}^{j1} & \cdots & W_{i1}^{jnj} \\ \vdots & \ddots & \vdots \\ W_{ini}^{j1} & \cdots & W_{ini}^{jnj} \end{bmatrix} \tag{5.5}$$

Finally, the final matrix for comparisons of all subsets with each of the other subsets called supermatrix is formed as shown in Equation (5.6):

$$W = \begin{bmatrix} W_{11} & \cdots & W_{1N} \\ \vdots & \ddots & \vdots \\ W_{N1} & \cdots & W_{NN} \end{bmatrix} \tag{5.6}$$

The final preference for each element of each subgroup based on the Saaty argument which is in accordance to Markov chain and is expressed via the limit given in Equation (5.7):

$$W_C = \lim_{n \longrightarrow \infty} w^{2n+1} \tag{5.7}$$

In this case, the supermatrix elements converge to a unit value whose values are equal in each row of the supermatrix. Thus, it is possible to prioritize alternatives by comparing and sorting the W_C matrix values in each column [36].

5.4 VIKTOR analysis method

Multiple-criteria decision-making models are among the decision-making models that have been famous in the last two decades. These strategies and models have been widely applied in complex decision-making (when there are multiple and sometimes conflicting criteria). The great capability of these strategies in reducing the complexity of decision-making, the simultaneous use of quantitative and qualitative criteria and giving a structured framework to decision-making issues and ultimately their ease of use have made them the best instruments of decision makers in different countries. These solutions formulate decision problems in the form of a matrix as follows and conduct the necessary analyses on them:

$$D = \begin{matrix} A_1 \\ A_2 \\ \vdots \\ A_m \end{matrix} \begin{bmatrix} x_1 & x_2 & \cdots & x_n \\ x_{11} & x_{12} & \cdots & x_{1n} \\ \vdots & \vdots & \ddots & \vdots \\ x_{m1} & x_{m2} & \cdots & x_{mn} \end{bmatrix} \tag{5.8}$$

Where A_i represents the i^{th} alternative, x_j is the j^{th} index, and x_{ij} represents the value of the j^{th} index for the i^{th} alternative. There are several multi-criteria decision-making methods, and each has its own characteristics and application conditions. One of the most important methods used is the VIKOR method [46].

The VIKOR method as one of the multiple-criteria decision making methods was developed to solve discrete decision problems with conflicting and noncommensurable criteria. This method focuses on ranking and selecting from a set of alternatives and determines compromising solutions to a problem with conflicting criteria. This method helps decision makers to reach the final decision. Compromising solution possible solution to the closest ideal and compromise is also an agreement on two-way relations [28]. The term "Vikor" is derived from the Serbian word (VlseKriterijumska I Kompromisno Optimizacija Resenje): multiple-criteria optimization and compromising solution [11]. The VIKOR method was introduced to optimize multiple -criteria problems in complex systems [27]. This method defines a ranked set of available alternatives according to the conflicting indicators. The main purpose of the VIKOR method is to be closer to the ideal solution of each index, so that the ranking of alternatives is based on this goal [26]. Multiple -criteria measurement for compromising ranking is developed using LP-metric as an integrated function in compromising planning. Alternatives are defined as $A_1, A_2, ..., A_n$. For the alternative $\{A_j, j = 1, 2, ..., n\}$, the ranking is based on the i^{th} index as a_{ij}. In other words, a_{ij} is the value of i^{th} cirterion for the alternative A_j, so that n is the number of alternatives and n is the number of criteria. The VIKOR method is developed with the following LP-metric form:

$$L_{p,j} = \left\{ \sum_{i=1}^{m} \left[\frac{w_i(f_i^+ - a_{ij})}{(f_i^+ - f_i^-)} \right]^p \right\}^{\frac{1}{p}} \tag{5.9}$$

As we have $1 \leq P \leq \infty$ and $i = 1, 2, ..., m$. $L_{1,j} = S_j = \sum_{j=1}^{n} \frac{w_j(f_j^+ - f_{ij})}{(f_j^+ - f_j^-)}$ and $L_{\infty,j} = R_j = \max_j \left[\frac{(w_j(f_j^+ - f_{ij}))}{(f_j^+ - f_j^-)} \right]$ are used to measure ranking in the VIKOR method. $L_{1,j}$ can provide information about the maximum group utility for decision makers, and $L_{\infty,j}$ can also provide information a minimum individual regret of the "opponent" for decision makers [28]. The VIKOR method includes the following stages:

a) Making the decision matrix dimensionless using the following equation:

$$f_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{m} x_{ij}^2}} \tag{5.10}$$

b) Determine the positive ideal solution (A^+) and the negative ideal solution (A^-) using the following equations:

$$A^+ = \{(\max f_{ij} | j \in J) \text{ or } (\min f_{ij} | j \in J) | i = 1, 2, ..., m\} = \{f_1^+, f_2^+, ..., f_j^+, ..., f_n^+\} \tag{5.11}$$

$$A^- = \{(\min f_{ij} | j \in J) \text{ or } (\max f_{ij} | j \in J) | i = 1, 2, ..., m\} = \{f_1^-, f_2^-, ..., f_j^-, ..., f_n^-\} \tag{5.12}$$

c) Calculate the maximum group utility (S_i) and the minimum of individual regret of the opponent (R_i) values for each of the alternatives using the following equations:

$$S_i = \frac{\sum_{j=1}^{n} w_j(f_j^+ - f_{ij})}{(f_j^+ - f_j^-)} \tag{5.13}$$

$$R_i = \max_i \left[\frac{w_j(f_j^+ - f_{ij})}{(f_j^+ - f_j^-)} \right] \tag{5.14}$$

Where S_i and R_i are the maximum group utility and the minimum of individual regret of the opponent values each of the options and w_j is the weight of each of the criteria.

d) Calculate the Victor index using the following equation:

$$Q_i = v \left[\frac{S_i - S^+}{S^- - S^+} \right] + (1 - v) \left[\frac{R_i - R^+}{R^- - R^+} \right] \tag{5.15}$$

Where in the above relation, Q_i is the value of the VIKOR index for the i^{th} alternative; $S^+ = \min S_i,\ S^- = \max S_i,\ R^+ = \min R_i,\ R^- = \max R_i$ and v are considered as the maximum group utility which is considered normally as 0.5.

e) Ranking alternatives: The alternative to which the VIKOR technique has allocated the least weight is the best alternative in terms of the VIKOR technique [47].

6 Results

According to the research literature and the results of field studies and research, seven factors of financial ability, proposed price, company services, quality, supplier resources, delivery time and reputation of company (brand) were selected as the most important factors of evaluation and selection of supplier.

It is worth to mention that for different criteria, the following symbols are used: financial ability (C1), proposed price (C2), company services (C3), quality (C4), supplier resources (C5), delivery time (C6) and company reputation (brand) (C7).

Table 2: Decision table

Alternatives	**Criteria**						
	C1	C2	C3	C4	C5	C6	C7
A	94	93	98	88	96	88	93
B	92	93	94	91	90	86	81
C	92	83	88	93	83	81	85
D	96	98	100	88	85	91	79
E	83	88	86	94	100	82	81
F	91	89	97	91	84	88	100
G	88	87	83	100	91	100	76
H	79	97	87	93	87	86	77
Weight	0.232	0.211	0.184	0.119	0.112	0.069	0.072
f_j^+	100	98	100	100	100	100	100
f_j^-	79	83	83	88	83	81	76

According to the allocated scores and the maximum and minimum values for each criterion, finally, the values of utility indices (S), regret (R) and VIKOR indices are presented in Table 3.

As shown in Figure 1, supplier B is in a better position in the Q index compared to other suppliers.

As shown in Table 4, after weighing the important and effective factors on the evaluation and selection of suppliers using network analysis method, it was determined that based on the opinions of experts, the highest weight is the

Table 3: Utility (S), regret (R) and VIKOR (Q) indices

Alternatives	S	R	Q
A	0.329	1	0.479
B	0.453	0.792	0.815
C	0.692	1	0.000
D	0.314	1	0.500
E	0.652	0.947	0.178
F	0.466	0.941	0.440
G	0.580	1	0.148
H	0.663	1	0.038

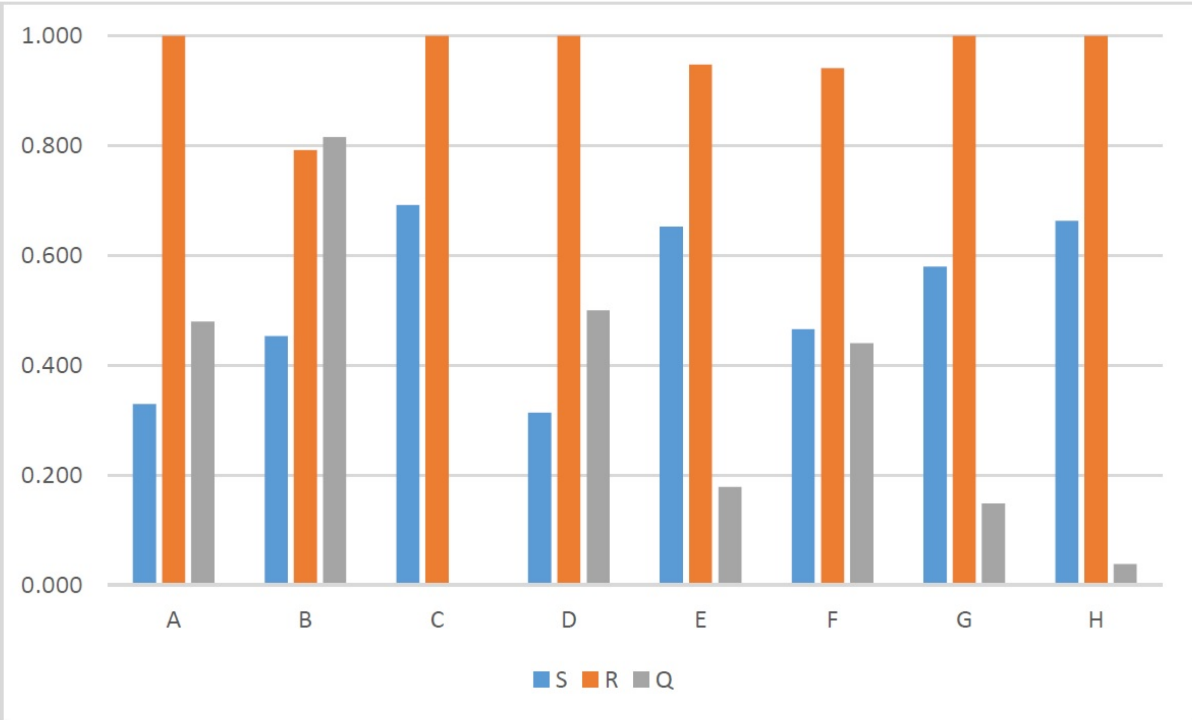

Figure 1: Comparison of S, R and Q index values for suppliers

Table 4: Weights of evaluation criteria

Criterion	Final weight with network analysis	Weights to hierarchy analysis
Financial ability	0.232	0.261
Proposed price	0.211	0.223
Company services	0.184	0.184
Quality	0.119	0.109
Supplier resources	0.112	0.102
The delivery duration of goods and services	0.069	0.060
Company's reputation (brand)	0.072	0.061

financial ability of the supplier (0.232), then, the supplier's proposed price (0.211) is in the second rank. Also, the least value of weights and importance is allocated to the delivery time of goods and services (0.069) and company reputation (brand) (0.072). As shown in Table 4, there is a difference between the weighting in the hierarchical analysis method and the proposed method as in the network analysis method, the resulting weights has a more logical basis.

Table 5 presents a comparison between traditional methods and the proposed method for ranking suppliers.

Table 5: Final ranking of suppliers

Supplier	Final weight using VIKOR method	Supplier rank
A	0.479	3
B	0.815	1
C	0.000	8
D	0.500	2
E	0.178	5
F	0.440	4
G	0.148	6
H	0.038	7

As shown in Table 5, supplier B has the first and highest priority. After B, supplier D has the highest next priority. The schematic structure of decision-making in problem solving and a summary of the results obtained are shown in Figure 2.

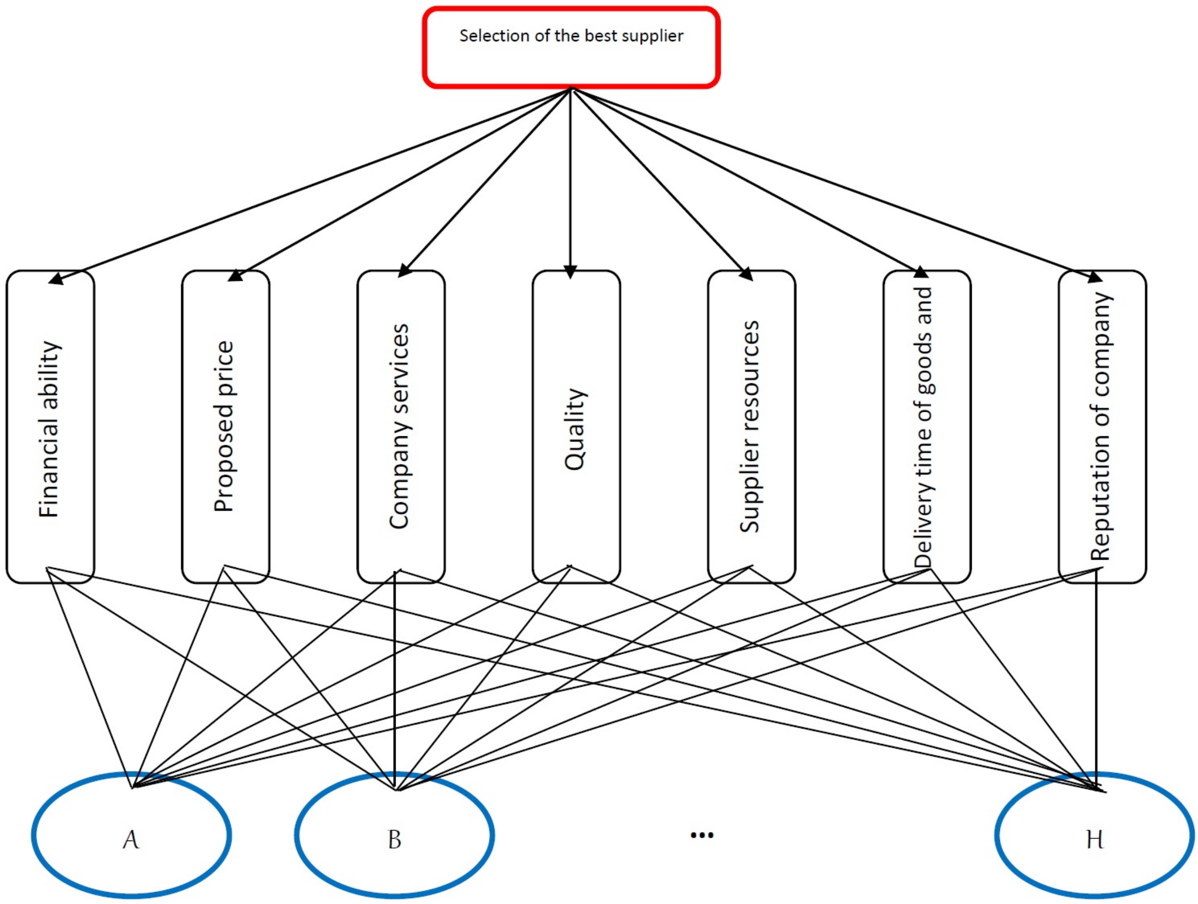

Figure 2: The hierarchy structure and a summary of the research results

7 Discussion and conclusion

Regarding the identification of the key factors of supplier evaluation, the results of the present study are consistent with the results of the researches of Da Silva et al. [14], Korpela et al. [20], Boer et al. [15], Bello [10], Wang et al. [43], Bayazit [9] and Sonmez [40]. Regarding the determination of the weights of criteria using the network analysis process method, the results of the present study are in line with the results of the study of Bayazit [9], Wu et al. [46, 47], Vinodh et al. [42], Sarkis and Telluri [37], Gencer and Gürpinar [17] who indicated that the use of the network analysis method, obtains accurate weights for evaluation. Also, regarding the ranking using VIKOR method, the results of the present study are consistent with the results of the researches of Mozafari et al. [25] and have similar results regarding the high power of ranking by VIKOR method with the study done by Agirgun [2].

Organizations are recommended to use the proposed integrated model as it can consider quantitative and qualitative criteria simultaneously. By calculating the VIKOR index, the suppliers can be ranked and the best ones are selected. However, the improvement of this method to solve the problem of evaluation and selection of suppliers with more efficiency, accuracy and precision can be used in the future studies. Given that the supply chain has provided a suitable platform for organizing knowledge in terms of its structure and subsets as well as the type of relationship between these sets, so using knowledge management besides promoting productivity, the great ideas can be implemented in the organization and create significant growth. The knowledge management project in supply chain can have effective benefits for organization, contractors, employees, customers and investors.

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