UDK: 005.311.12:657.631.6:[796/799
796/799:[005.5:159.947.2
(Originalni rad / Original scientific paper)

QUANTITATIVE METHODS IN FINANCIAL REPORTS AS SUPPORT TO MAKING BUSINESS DECISIONS IN THE SPORT INDUSTRY

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APSTRAKT

Structured or defined problems represent the most important characteristics relevant to the choice of methods and decision support procedures in this specific problem. Sport industry is specific because of specific inputs in process. Simply stated, the degree of structuring is the answer to the question of whether the problem is known and whether it is reliably known what needs to be done to solve the problem. It is precisely the fact that in the field of the relevance of the financial statements of business entities, a large number of semi-structured pro-

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blems are encountered, the basic motive for applying the principle of financial reporting was to present a decision support system that would help in monitoring and adhering to international accounting standards.

Ključne reči: sport industry, decision, quantitative methods.

INTRODUCTION

The application of the appropriate decision support system in the procedures for drawing up valid financial statements includes several parts. The subsystem of the database will contain the appropriate data obtained by analyzing the experts in the compiled financial report.

Special attention will be devoted to the DEMATEL method and the TOPSIS method, which are methods of decision making, designed to assist decision-makers in solving complex decision-making issues involving a number of decision-makers, a number of criteria in multiple periods.

The DEMATEL method is intensively used in the analysis of the interdependence of multiple factors in complex systems, where uncertainty and risk dominate, in order to make timely decisions (Liu, Chen, 2020); Yazdi et al., 2020). This method helps in deriving interdependence information from a very small amount of data. Thus, the present study uses the DEMATEL method to study the interrelationship among hazards and then calculate the weights of hazards. After the procedure of determining the interdependence of the criteria, the TOPSIS method will be used to rank alternatives, which will serve decision makers in future strategic decision-making (Zhang, Su 2019).

Starting from the basic characteristics of the DEMATEL and TOPSIS methods, the authors tried to integrate them in order to establish a comprehensive assessment of the quality of financial reports when making decisions. The aim of this work is to make a comprehensive assessment of the significance of the application of the principle of balancing in the preparation of financial reports in the textile industry. Choice of applicable standards between IFAC, GAAS, GAAS British or national financial reporting standards on an IFAC or GAAS basis (Nobes, C., Parker, R. 2000).

Literature preview

The main advantages of using decision support systems are: [7]impacts on increasing the efficiency in the work of evaluation teams in terms of better understanding the process of managing nonconformities and shortening the time needed to verify corrective measures. The result of automatic decision support is to increase the consistency and accuracy of the decision made and, as well as time savings; expediteness in problem solving in such a way that management and appraisers can directly get answers to non-routine issues and look at more alternatives at the same time; facilitating mutual communication so that users of decision support systems are provided with tools for better understanding of the problem on which an analysis is based; promoting learning and reasoning based on the experience of other decision support systems enable a better understanding of the process of managing the inconsistencies and the environment in which decisions are made (Vidovič & Milunović, 2017).

According to Milojević, I. and Zekić, M. (2015) in most countries, financial statements are prepared on an accounting basis of historical value (historical cost), which means at the purchase price for acquired parts of the property, or at the cost price when it comes to parts of the property realized in the production process, except assets (real estate, plant and equipment, investments) that can be revalued. However, there are economies in which legal entities present financial statements on the basis of the current value, which means that they contain the effects of changes in prices in the values of the held assets held (paragraph 6). In both cases, the financial statements have a direct or indirect impact on the price change resulting from the reasons given for the reasons.

Lazić, S. (2018) stated that the general purpose of balancing is to look at the business activity, the structure of the property and the capital of a specific budget user. There are several balancing goals depending on what the balance displays (Novaković, Jovićević, & Simin, 2018). Balancing objectives are achieved by applying different, formal and material balancing rules, based on which an annual account is obtained which will be understandable, reliable, comparable and which contains all the relevant information that is necessary for making decisions in the following business period (Kostić, 2020).

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[7] Power, D.J.: Decision Support Systems: concepts and resources for managers, Westport, Conn., Quorum Books, 2002, p. 6-8., navedeno u Radović, T., i dr.: Unapređenje performansi poslovnih procesa u okruženju sistema za podršku odlučivanju na primeru akreditovanih laboratorija, Zbornika radova, 38. Nacionalna konferencija o kvalitetu, FQ 2011, str. A-272-A-273.

Existing literature in the field of financial reporting is primarily focused on defining, determining functions, goals and its implementation (Lantto, 2020; Hellmann, Patel, 2021). Therefore, there is a lack of research on the optimization of the preparation and use of financial reports. Finance professionals are dependent on accounting information provided in annual reports and other both formal and informal information sources (Hellmann et al., 2020). In this regard, decision-making based on financial reports is widely used in the financial and banking sector, IT systems, supply chain management, etc. (Vinodh, Swarnakar, 2015). Such serious economic cases as Enron Event (Scandal) which are related to accounting issues show that the quality of a company's financial report (the accounting information quality) is not only related to the process of the company's internal accounting, but also to many external factors (Zhong, et al., 2015; Gigović et al., 2016).

Based on the fact that accounting standards, state audit, etc. affect directly or indirectly the quality of financial reports, modern research changes its course and moves from the inside of the corporation to the outside impacts to evaluate the quality of financial reporting from a wider scope (Zhong et al., 2015; Pourahmad et al. ., 2015). And they recommend corporations to take practical measures to implement integrated management over financial accounting reports whose information is false or of low quality. Against this backdrop, financial reporting supply chain emerges as the time requires and gradually becomes an important topic of accounting research and practice (Etezazian, Kharazi, Barati, 2015).

Methods

The problem in general terms is shown by choosing one of the *m* alternatives ($A_i, i = 1,2,...,m$), which are evaluated and compared among themselves based on *n* criteria ($X_j, j = 1,2,...,n$) whose values we know. Alternatives are shown to the vectors $x_{i,j}$, where the $x_{i,j}$ is value of the *i* alternative according to *j* ciretirion. Since the criteria vary in varying degrees on the final estimates of the alternatives, we assign each weight to a weight coefficient $w_{j,}\ j = 1,2,...n$ (where the $\sum_{j=1}^{n} w_j = 1$) which reflects its relative importance in evaluating alternatives.[8]

[8] Kashi, K., Franek, J.: Utilizing DEMATEL Method in Competency Modeling, *Forum Scientiae Oeconomia*, Vol. 2, No. 1 (2014), pp. 95-106.

The identification of the criteria and the calculation of the weight of the criteria to be implemented using the DEMATEL method include the following steps:[9]

Step 1: Gathering the opinions of experts and calculating the average matrix Z.

In this step, a group of experts and n factors is observed. Each expert should see the degree of direct impact between two factors on the basis of pairing. The influence of the factor *i* on the factor *j* is expressed by the degree $z_{i,j}$. For each expert a nonnegative matrix is formed $Z^e = \left[z_{ij}^e \right]$, where the *e* is a number of experts who take part in evaluating the factors and it is placed in the interval $1 \le e \le k$. In this way, the matrices are made $Z^1, Z^2, ..., Z^k$ for *m* experts. By merging all expert grades, the final matrix $Z^e = \left[z_{ij}^e \right]$ has a shape

$$z_{ij} = \sqrt[k]{\prod_{i=1}^{k} z_{ij}^e} \tag{4.1}$$

where z_{ij}^e is preference of the *e* expert, and *k* is total number of experts.

Step 2: Calculate the initial normalized direct-link matrix D.

After normalizing the initial matrix of a direct connection $D = \left[d_{ij} \right]$ the value of each element in the matrix *D* moves in the interval [0, 1]. This matrix is expressed by the following relation:

$$D = \begin{bmatrix} d_{11} & d_{12} & \dots & d_{1n} \\ d_{21} & d_{22} & \dots & d_{2n} \\ \dots & \dots & \dots & \dots \\ d_{n1} & d_{n2} & \dots & d_{nn} \end{bmatrix} \tag{4.2}$$

where the matrix elements are obtained from a relation:

$$d_{ij} = \frac{Z_{ij}}{R} \tag{4.3}$$

$$R = \max\left(\sum_{j=1}^{n} Z_{ij} \right) \tag{4.4}$$

where n is the total number of factors.

[9] Pamučar, D., Ćirović, G.: The selection of transport and handling resources in logistics centers using Multi-Attributive Border Approximation area Comparison (MABAC), Expert Systems with Applications, Elsevier, 42 (2015), pp. 3016-3028.

Step 3: Perform a complete relationship matrix T.

The total impact T matrix is obtained by using the equations (4.5) and (4.6) where *I* is $n \times n$ unit matrix. If the element t_{ij} represents the indirect effects of the factor *i* on the factor *j*, then the matrix *T* reflects the interdependence of each pair of factors.

$$T = \lim_{m \to \infty}(D + D^2 + ... + D^m) = \sum_{m=1}^{\infty} D^i \tag{4.5}$$

where

$$\begin{aligned} \sum_{m=1}^{\infty} D^i &= D + D^2 + ... + D^m = \\ &= D(I + D^1 + D^2 + ... + D^{m-1}) \\ &= D(I - D)^{-1}(I - D)(I + D^1 + D^2 + ... + D^{m-1}) \\ &= D(I - D)^{-1}(I - D^m) \\ &= D(I - D)^{-1} \end{aligned} \tag{4.6}$$

Based on the above, the following matrix is obtained

$$T = \begin{bmatrix} t_{11} & t_{12} & ... & t_{1n} \\ t_{21} & t_{22} & ... & t_{2n} \\ ... & ... & ... & ... \\ t_{n1} & t_{n2} & ... & t_{nn} \end{bmatrix} \tag{4.7}$$

where t_{ij} is the assessment of the decision maker for each alternative *i* and in relation to the criterion *j*.

Step 4: Calculating the sum of the rows and columns of the matrix T.

The following relations will serve to show the total influence in the T matrix:

$$D_i = \sum_{i=1}^{n} t_{ij,} \quad i = 1, 2, ..., n \tag{4.8}$$

$$R_i = \sum_{j=1}^{m} t_{ij,} \quad j = 1, 2, ..., m \tag{4.9}$$

where n represents the number of criteria.

When $i = j$, then the sum (+) shows the total effect of factors on other factors and other factors on the factor *i*. Therefore, (+) indicates the degree of importance of the factor *i* for the whole system. In contrast, the difference (-) indicates the individual *i* factor influence on the system. If the difference (-) is positive then the factor *i* affects other factors, and if (-) is negative, then other factors affect the factor *i*.

Step 5: Determination of the limit value (α)

Granična vrednost (α) se dobija korišćenjem formule:

$$\alpha = \frac{\sum_{i=1}^{n} \sum_{j=1}^{n} \left[t_{ij} \right]}{N} \tag{4.10}$$

This value should allow for the elimination of some minor effects of elements in the matrix *T*.

Step 6: Creating a causal relationship diagram.

A causal relationship diagram is developed to visually represent complex relationships and provide information to draw conclusions as to which factors are most important and how they affect one another.

Step 7: Determination of the weight coefficients of the criteria. The weight coefficients of the criteria are determined using the expression

$$W_i = \sqrt{(G_i + R_i)^2 + (G_i - R_i)^2} \tag{4.11}$$

Step 8: Normalization of weight coefficients is done using the term

$$w_i = \frac{W_i}{\sum_{i=1}^{n} W_i} \tag{4.12}$$

where w_i represent the final weight of the criteria to be used for making decisions.

After gaining weight coefficients, the conditions for representing the mathematical formulation of the TOPSIS method have been created.

The advantages of using the TOPSIS method are as follows: the user can express his preferences by assigning weight coefficients by the criteria (by determining the relative weight by the criteria); ease of use; clearly defined ranking alternative.

The disadvantages of using TOPSIS methods are the following: the solution directly depends on the input values (evaluating alternatives by criteria); criteria are of linear character.

The process of implementing the TOPSIS method consists of 6 steps:[10]

First, define the terms that will be used. Here, the decision matrix *R* is used, where each row of the matrix corresponds to one alternative, and each column is one criterion; element r_{ij} represents the performance of the alternative A_i in relation to the criterion C_j. For *m* criteria ($C_{1,}\, C_{2,}\ldots, C_m$) and *n* alternatives ($A_{1,}\, A_{2,}\ldots, A_n$) the matrix *R* has the form

$$R = \begin{matrix} A_1 \\ A_2 \\ . \\ A_3 \end{matrix} \begin{bmatrix} r_{11} & r_{12} & \ldots & r_{1m} \\ r_{21} & r_{22} & \ldots & r_{2m} \\ \ldots & \ldots & \ldots & \ldots \\ r_{n1} & r_{n2} & \ldots & r_{nm} \end{bmatrix} \tag{4.13}$$

and the values ($w_{1,}\, w_2, \ldots, w_m$) represent the weight values of the criteria obtained in the previous procedure of applying the **DEMATEL** method.

Step 1: Normalize the value of the decision matrix;

$$x_{ij} = \frac{r_{ij}}{\sqrt{\sum_{i=1}^{n} r_{ij}^2}} \tag{4.14}$$

$$X = \begin{matrix} A_1 \\ A_2 \\ . \\ A_3 \end{matrix} \begin{bmatrix} x_{11} & x_{12} & \ldots & x_{1m} \\ x_{21} & x_{22} & \ldots & x_{2m} \\ \ldots & \ldots & \ldots & \ldots \\ x_{n1} & x_{n2} & \ldots & x_{nm} \end{bmatrix} \tag{4.15}$$

[10] Balli, S., Korukoglu, S.: Operating System Selection Using Fuzzy AHP and TOPSIS methods, *Mathematical and Computational Applications*, Association for Scientific Research, Vol. 14, No. 2, 2009, pp. 119-130.

Step 2: Multiplication of the normalized values of the decision matrix with the weight coefficients of the criteria. The weighted normalized performance matrix is determined by the following relationship $V = (v_{ij})$, where each v_{ij} is the product of the normalized performance of the alternative and the corresponding weight coefficient of the criteria.

$$V = \begin{matrix} A_1 \\ A_2 \\ . \\ A_3 \end{matrix}\begin{bmatrix} v_{11} & v_{12} & \dots & v_{1m} \\ v_{21} & v_{22} & \dots & v_{2m} \\ \dots & \dots & \dots & \dots \\ v_{n1} & v_{n2} & \dots & v_{nm} \end{bmatrix} = \begin{matrix} A_1 \\ A_2 \\ . \\ A_3 \end{matrix}\begin{bmatrix} w_1x_{11} & w_2x_{12} & \dots & w_mx_{1m} \\ w_1x_{21} & w_2x_{22} & \dots & w_mv_{2m} \\ \dots & \dots & \dots & \dots \\ w_1x_{n1} & w_2x_{n2} & \dots & w_mx_{nm} \end{bmatrix} \tag{4.16}$$

Step 3: Determine Ideal Solutions. The perfect solution A^* and the Negative ideal solution A^- are determined by means of relations:

$$A^* = \left\{(\max v_{ij} \mid j\varepsilon G), (\min v_{ij}, j\varepsilon G'), i = 1,..,n\right\} = \left\{v_1^*, v_2^*, ..., v_m^*\right\} \tag{4.17}$$

$$A^- = \left\{(\min v_{ij} \mid j\varepsilon G), (\max v_{ij}, j\varepsilon G'), i = 1,..,n\right\} = \left\{v_1^-, v_2^-, ..., v_m^-\right\} \tag{4.18}$$

where

G={j=1,2,...,m | j belongs to the criteria that are maximized}

G'={j=1,2,...,m | j belongs to the criteria that are minimized}

Step 4: Determine the distance of alternatives from ideal solutions. In this step, use the following relations

$$S_i^* = \sqrt{\sum_{j=1}^{m}(v_{ij} - v_j^*)^2}, i = 1,..., n \tag{4.19}$$

$$S_i^- = \sqrt{\sum_{j=1}^{m}(v_{ij} - v_j^-)^2}, i = 1,..., n \tag{4.20}$$

to calculate *n* dimensional Euclidean distance of all alternatives from an ideal and ideal negative solution.

Step 5: Determine the relative proximity of the alternative to the ideal solution. For each alternative, a relative distance is determined

$$Q_I^* = \frac{S_i^-}{S_i^* + S_i^-}, i = 1,...,n \quad (4.21)$$

where $0 \le Q_I^* \le 1$.

Step 6: Ranking alternatives. Alternatives are ranked by decreasing values Q_I^*.

Alternativa 1 - IFAC standardi, Alternativa 2- GAAS američki standardi, Alternativa 3 - GAAS Britanski standardi, Alternativa 4- nacionalni standardi na IFAC osnovi i Alternativa 5- nacionalni standardi na GAAS osnovi.

In modern business, great attention is paid to the preparation of financial statements, as the necessity of ensuring the efficiency of making business decisions of the management imposes the need to increase the safety of the preparation of the financial statements. In order to achieve this, it is essential that the procedures for compiling the financial statements are supported by the use of modern decision support systems, as set out in the previous chapter.

RESULTS AND DISCUSSION

Based on earlier research carried out by Vukša S. and Milojević I.[11], the criteria for the selection of the principle of regular balancing were selected (Table 1)

Table 1: Balancing principles

Prinicple name and symbol	Principle description
Cost principle (C_1)	The cost principle requires that the record of business events is based on the purchase value, or the cost of procurement. The basis for determining costs is a cash expense or other cash equivalent, expressed in national currency.
Objectivity principle (C_2)	The objectivity principle is based on the assumption that the financial statements must be compiled on the basis of objective, documented data. The existence of a documented bookkeeping record is a consequence of the application of this principle.

[11] Vukša, S., Milojević, I. (2009). *Analiza bilansa*. Univerzitet Braća Karić: Fakultet za menadžment.

Realization principle (C_3)	The realization principle requires that revenues are recorded when they are actually incurred, when they are earned, and not when the money is actually received. There are two important conditions to be respected: that the goods are actually delivered to the customer, that is, a certain service has been performed and that there is no uncertainty in the collection.
Matching principle (C_4)	The matching principle is related to the determination of business results. Since the business result is determined as a difference in revenues and expenditures, it is necessary that these two categories be opposed or compared. In doing so, it is important to compare only the income and expenses that relate to the same accounting period.
Materiality principle (C_5)	The materiality principle requires respect for all principles that play a significant role in creating a real image of an enterprise. On the other hand, it allows for deviation from those principles whose implementation is difficult, but they do not significantly affect the level of the achieved business result and with the obligatory statement of reasons and the effect of deviation.
Full-disclosure principle (C_6)	The full-disclosure principle requires that the financial statements contain all the relevant information necessary for the assessment of the business of the company. This does not mean that reports must and should be dedicated to detail, but that no significant information should be omitted.

In the first step of the DEMATEL method, the Saaty scale was used to compare the criteria (Table 2). The scale shown is used to obtain the criterion matrix criteria $Z = \left[z_{ij} \right]$.

Table 2: Saaty Values Scale

Importance	Definition	Explanation
1	Same importance	Two elements are identical in meaning to the goal
3	Poor dominance	Experience or reasoning slightly favors one element in relation to the other
5	Strong domninance	Experience or judgment greatly favors one element in relation to the other
7	Demonstrated dominance	The dominance of one element is confirmed in practice
9	Absolute dominance	Dominance of the highest degree
2,4,6,8	Between values	Compromise needed or further division

The data in Table 3 represent the starting basis for obtaining the initial normalized direct coupling matrix D. By applying the expressions (4.3) and (4.4) we obtain the matrix D (Table 3).

Table 3: Normalized direct-link matrix

	C_1	C_2	C_3	C_4	C_5	C_6
C_1	0,06	0,03	0,13	0,18	0,02	0,42
C_2	0,12	0,06	0,20	0,17	0,17	0,28
C_3	0,02	0,02	0,06	0,07	0,18	0,12
C_4	0,02	0,02	0,05	0,06	0,18	0,07
C_5	0,15	0,03	0,02	0,02	0,06	0,08
C_6	0,01	0,01	0,02	0,05	0,04	0,06

Based on the elements of the matrix D and applying the expressions (4.5) and (4.6), the matrix elements of the total relation T are determined. The overall relationship matrix is shown in Table 4.

Table 4: The overall relationship matrix

	C_1	C_2	C_3	C_4	C_5	C_6
C_1	0,1105	0,0561	0,1952	0,2708	0,1473	0,5705
C_2	0,2125	0,0995	0,2971	0,2961	0,3387	0,5112
C_3	0,0732	0,0385	0,0984	0,1195	0,2509	0,2146
C_4	0,0703	0,0369	0,0848	0,1038	0,2424	0,1561
C_5	0,1894	0,0471	0,0689	0,0847	0,1147	0,2086
C_6	0,0274	0,0171	0,0360	0,0709	0,0708	0,0971

In order to create a diagram of the causative-consequence relations, using the expressions (4.8) and (4.9) the sum of the direct and indirect interaction factors of the factor system is determined (Table 5).

Table 5: Sum of direct (D) and indirect (R) effects of the factor

	D	**R**
C_1	1,35	0,68
C_2	1,76	0,30
C_3	0,80	0,78
C_4	0,69	0,95
C_5	0,71	1,16
C_6	0,32	1,76

Based on the expression (4.10), a diagram of cause-effect relationships has been developed with the aim of visual representation of complex relations, Figure 1.

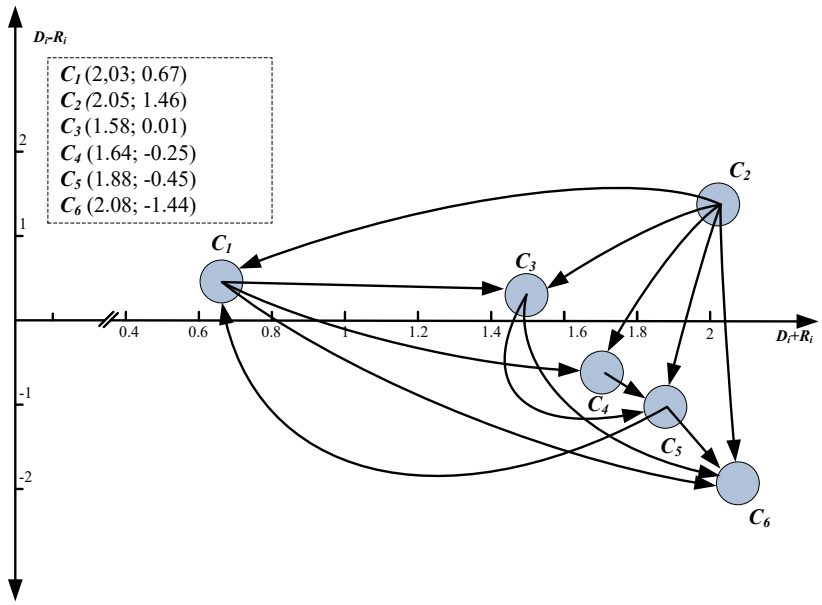

Figure 1: Diagram of causal relationship

The presented diagram provides information on the significance of the factors on the system and the interaction of the presented factors with each other. The matrix factors of the total relation whose value is greater than the limit value α ($\alpha = 0.16$) are chosen due to the display of cause-effect connections.

After determining the relationship between the criteria (factors) using the expressions (4.11) and (4.12) we determine the weighting coefficients of the criteria (Table 6).

Table 6: Critical criteria criterion (w)

	D+R	*D-R*	*W*	*w*
C_1	2,03	0,67	2,14	0,173
C_2	2,05	1,46	2,52	0,204
C_3	1,58	0,01	1,58	0,128
C_4	1,64	-0,25	1,66	0,134
C_5	1,88	-0,45	1,93	0,156
C_6	2,08	-1,44	2,53	0,205

In addition to the initial decision matrix (4.13), the weight coefficients of the criteria represent the input parameters for the application of the TOPSIS method (Table 7).

Table 7: Home matrix of decision making

	C_1	C_2	C_3	C_4	C_5	C_6
A1	2,11	3,03	0,42	0,22	0,20	1,05
A2	1,83	2,87	0,33	0,28	0,16	1,20
A3	2,60	4,11	0,51	0,15	0,08	0,92
A4	1,68	2,43	0,23	0,30	0,22	1,53
A5	2,23	2,75	0,47	0,17	0,11	1,13
w_i	0,173	0,204	0,128	0,134	0,156	0,205

After calculating the weight coefficients of the criteria (w_i)conditions for evaluation and selection of optimal alternatives with the TOPSIS method have been acquired. Using the expression (4.14), the elements of the initial decision matrix are normalized. By multiplying the normalized elements of the matrix (4.15) with weight coefficients (w_i) a difficult noramylated matrix (4.16) is obtained, as shown in Table 8.

Table 8: Weighted normalized matrix

	C_1	C_2	C_3	C_4	C_5	C_6
A1	0,077	0,089	0,059	0,057	0,086	0,081
A2	0,067	0,085	0,047	0,073	0,069	0,093
A3	0,095	0,121	0,072	0,039	0,034	0,071
A4	0,062	0,072	0,032	0,078	0,095	0,118
A5	0,082	0,081	0,066	0,044	0,047	0,087

Using the expressions (4.17) - (4.21), the final rank of the alternative is obtained, which is shown in Table 9.

Table 9: The final ranking alternative

	S_i^+	S_i^-	Q_i	**Rank**
A1	0,0581	0,0661	0,5321	2
A2	0,0642	0,0564	0,4679	3
A3	0,0858	0,0717	0,4555	4
A4	0,0717	0,0858	0,5445	1
A5	0,0784	0,0458	0,3686	5

By using the combination of DEMATEL and TOPSIS, the solution is that the safest financial statement, under number 4, achieves the highest ranking among all alternative balancing principles. However, it should be emphasized that in this way, the resulting result is only a possible variant, because the application of multi-criteria optimization does not mean a rigorous solution, but an option that can only be checked by comparing several different methods and scales of assessment.

CONCLUSION

The problem of determining the significance of the criteria in the process of preparing a financial report in the sport industry includes several concepts that need to be defined. The choice of the optimal attitude to respecting the balance principle is the goal of this problem.

The process of balancing the conditions for the existence of an enterprise based on an adequate organizational structure consists of three interconnected and conditioned elements. First, in the analysis of competitive forces it is shown why some branches are inherently more profitable, or more attractive than others, and why in these branches the value of the company grows. Secondly, the characteristics of the strategic group and the positions within it can significantly influence the change in the relative position of the company in the branch, and of course the business value. The third and last step, the value chain analysis serves to identify the source of competitive advantage. Creating the value of an enterprise abstracts these factors by applying different methods and procedures in determining the market position.

The notion of criteria takes an important place in the decision-making process on the most favorable alternative. Quantitative criteria can be precisely measured and expressed by different measuring units. Qualitative criteria cannot be expressed in measuring units. They can be classified into two subgroups: attributes whose values cannot be precisely measured but can still be sorted by "intensity" and attributes on the basis of which no quantitative comparison of alternatives can be made.

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Rad primljen: 27.04.2023.

Rad prihvaćen: 18.07.2023.