A FAHP AND VIKOR METHOD FOR EVALUATION OF THE FINANCIAL PERFORMANCE OF AGRICULTURE COMPANIES LISTED ON THE BELGRADE STOCK EXCHANGE

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ABSTRACT

Decision-making can be improved by using different models by financial statements users for different purposes. In this paper, the FAHP model was implemented for financial performance evaluation of companies operating within the A-agriculture, forestry and fisheries sectors on the Belgrade Stock Exchange. In addition, we used the VIKOR method, for ranking companies against the results achieved. With all the constrains shown, the research presented in this paper, raises questions for insight and future development, through the possibilities of ranking the financial performance of the company.

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Introduction

Agricultural activities are of great importance to any economy. Agricultural production systems are very complex. The argument for this claim lies in the fact that these systems are influenced by the interaction of social and environmental factors. Dimensioning these factors can often be difficult (Nkurunziza et al. (2020). Given the benefits it leads to, as well as the risks it faces, it is important to explore the efficiency of businesses in this area. In particular, it is significant to examine efficiency of publicly listed companies whose shares are traded on stock exchanges. In the case of the Republic of Serbia, this is the case of the A-agriculture, forestry and fisheries sectors and companies whose shares are listed on the Belgrade Stock Exchange. There are numerous internal and external factors that affect the work of these companies, and because of the importance of accounting information in agriculture for different, numerous users, the importance and needs of this research are perceived. In addition, the importance of applying different methods for evaluating financial performance in agriculture and thus further supporting decision-making is also emphasized. There is an obvious problem of obtaining reliable data, its comparison, which clearly imposes the need for new research and relevant conclusions in this area. Financially sustainable business is influenced by a number of very complex factors, both internal and external (Srebro et al., 2021).

A specific field of the very nature of agricultural production, and special treatment of financial statements from this industry, lead to increased interest in this field. According to Sun (2010) "the analytic hierarchy process (AHP) is a powerful method to solve complex decision problems based on an additive weighting process, in which several relevant attributes are represented through their relative importance". Therefore, it is of great importance to compare the financial performance of the companies quantitatively (Milojević et al., 2021; Farrokh et al. 2016; Filgueira-Vizoso et al., 2023), through the results of FAHP models. It is considered significant that parts of the paper provide certain guidelines for improvement where this is possible. The above is the basis for adequate use of financial statements, all in synergy with the FAHP model, which as a mathematical model enables evaluation of the financial performance of the company. Therefore, the aim of this research is to evaluate the financial performance of companies listed in the sector of A-agriculture, forestry and fisheries in the Republic of Serbia using the FAHP framework.

At the beginning of the work, a review of literature was presented, followed by research methodology and theoretical basis of FAHP models and VIKOR models, as well as a literature overview of these models. The following section presents the results and discussion on the research.

Literature Review

Much of the research uses the AHP method in the first phase, to address the priority weights of criteria used by FAHP (Meixner, 2009, Knežević et al., 2017), and in the second is specifically tailored to the objectives of the work in different fields of

observation. Various problems in agriculture were discussed using the AHP model (Bogdanović & Hadžić, 2019; Ali et al., 2021; Veisi et al., 2022). One of the papers describes in detail the potential of the AHP method in choosing the best alternative in the decision tree with multiple criteria (see Brožova, 2004; Kong et al., 2005), especially emphasizing the importance of both the AHP method and other mathematical methods for decision-making processes in agricultural practice. In the work of Lu et al. (2014), the AHP weighting method is applied for the purpose of evaluating financial data for the sector that includes agriculture, forestry, animal husbandry and fisheries. The model relies on the analysis of profitability, solvency, capacity (operating & developmental), and liquidity. In doing so, two methods were combined - the analytical hierarchical process and the variance weighting method. Table 1 illustrates a short literature review emphasizing the main theoretical contributions related to application of the FAHP/AHP methods in the agricultural area.

Table 1. Theoretic and empirical contributions on FAHP/AHP methods in the agricultural area

Author	Focus	Methodology
Tashaoy et al. (2019)	determining land suitability for a watershed	FAHP
Sicat at al. (2005)	determining land suitability classification	AHP
Demirel et al. (2012)	risk-based evaluation of agricultural strategies	FAHP & FANP
Alphonce, C. B. (1997)	identifying potential applications in agricultural decisions in developing countries	AHP
Aktun & Samut (2013)	evaluating agricultural performance of the provinces of country	FAHP & VIKOR
Yang et al. (2019)	optimization of the disassembly line balancing model for agricultural machinery	FAHP
Choi et al. (2013)	finding the best way of agricultural reservoir water resources assessment	FAHP
Toloi et al. (2022)	determination of factors that are relevant for decision-making on soybean production	AHP

Source: Author's systematization

The AHP method was also used to evaluate criteria when evaluating agro-industrial projects (Din & Yunusova, 2016) and when formulating public policies related to family farms (Petrini et al., 2016).

Methodology

Existing knowledge of the financial performance of agricultural enterprises in the Republic of Serbia demonstrates the sense of using the FAHP method.

The research in the paper was conducted on a sample of 18 joint-stock companies listed on the Belgrade Stock Exchange within Sector A-Agriculture, Forestry and Fisheries. These are companies that are registered with the Agency for Business Registers under the activity code 0111 - Cultivation of cereal (except rice), legumes and oilseeds and that had made financial statements publicly available as of April 1, 2022. Thus, the research included the following companies: Agrobačka a.d. Bačka Topola, Bačka a.d. Sivac,

Bajinovac a.d. Bajina Bašta, Borac a.d. Šurjan, PP Feketić a.d. Sombor, Hajdučica a.d. Hajdučica, Irmovo a.d. Kisač, Jadran a.d. Nova Gajdobra, Lučić Prigrevica a.d. Novi Sad, Mitrosrem a.d. , Sremska Mitrovica, Nova Peščara a.d. Deliblata, Omoljica a.d. Omoljica, PTK Panonija a.d. Panonija, PP Miletić a.d. Sombor, Sloga a.d. Banatski Karlovac, Sloga a.d. Kać, Stari Tamiš a.d. Pančevo and Vojvodina a.d. Sombor. For the purposes of the research, data from the individual financial reports of the aforementioned companies in the period from 2015 to 2020 were used.

FAHP

Van Laarhoven (1983) proposed a method of fuzzy judgment by comparison to the triangular fuzzy number. Chang (1996) proposed the principle for comparison between the elements of the fuzzy numbers (see Zhu et al., 1999), and published it later in 1996. This work is considered the first, ma0king Chang the inventor of the FAHP method. Decision-making using the Fuzzy AHP method enabled the development of different approaches, and one of them is a fuzzy expanded AHP method based on fuzzy triangle numbers (Chang, 1996). Like all methods, this one has critics, but even so, its widespread prevalence and application in different decision-making areas is noticeable.

$X = \{x_1, x_2, ..., x_n\}$ is a set of objects, and $G = \{g_1, g_2, ..., g_n\}$ is a set of goals. The extended analysis methodology Chang (1996) for each object taken provides an extended analysis of the goal g_i. Extended Analysis Values m for each object can be presented as follows:

$$M_{g_i}^1, M_{g_i}^2, ..., M_{g_i}^n, i = 1, 2, ..., n, \qquad (1)$$

where $M_{g_i}^j, (j = 1, 2, ..., m)$ are fuzzy triangular numbers. This is the analysis of the following steps:

Step 1: The values of fuzzy extensions for the *i*-th object in Expressions (2):

$$S_i = \sum_{j=1}^{m} M_{g_i}^j \otimes \left[\sum_{i=1}^{n} \sum_{j=1}^{m} M_{g_i}^j \right]^{-1} \qquad (2)$$

In order to obtain the expression $\left[\sum_{i=1}^{n} \sum_{j=1}^{m} M_{g_i}^j \right]^{-1}$, it is necessary to perform additional fuzzy operations with values of the extended analysis, which is represented by Expressions (3), (4):

$$\sum_{j=1}^{m} M_{g_i}^i = \left[\sum_{j=1}^{m} l_i, \sum_{j=1}^{m} m_i, \sum_{j=1}^{m} u_i \right] \qquad (3)$$

$$\sum_{i=1}^{n}\sum_{j=1}^{m} M_{g_i}^{j} = \left[\sum_{j=1}^{m} l_i, \sum_{j=1}^{m} m_i, \sum_{j=1}^{m} u_i\right] \quad (4)$$

In addition, to calculate the inverse vector using Expression (5):

$$\left[\sum_{i=1}^{n}\sum_{j=1}^{m} M_{g_i}^{j}\right]^{-1} = \left(\frac{1}{\sum_{j=1}^{m} u_j}, \frac{1}{\sum_{j=1}^{m} m_j}, \frac{1}{\sum_{j=1}^{m} l_j}\right) \quad (5)$$

Step 2: The degree of possibility for $M_2 = (l_2, m_2, u_2)$ and $M_1 = (l_1, m_1, u_1)$ is defined by Expression (6):

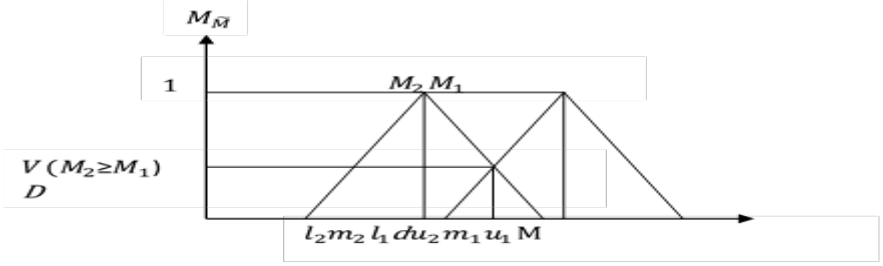
$$V(M_2 \geq M_1) = y \geq x\left[\min(\mu_{M_1}(x), \mu_{M_2}(y))\right] \quad (6)$$

It can be represented in the following manner by Expression (7):

$$V(M_1 \geq M_2) = hgt(M_1 \bigcap M_2) = \mu_{M_1}(d)$$
$$V(M_2 \geq M_1) = hgt(M_1 \bigcap M_2) = \mu_{M_2}(d) \quad (7)$$
$$= \begin{cases} 1 & m_2 \geq m_1 \\ 0 & l_1 \geq \mu_2 \\ \dfrac{l_1 - u_2}{(m_2 - m_1) - (m_1 - l_1)} & otherwise \end{cases}$$

Where d is the ordinate of the highest intersection point D between μ_{M_1} μ_{M1} and μ_{M_2} μ_{M2} (Figure 1). In order to compare M_1 and M_2, values of both $V(M_1 \geq M_2)$ $V(M1 \geq M2)$ and $V(M_2 \geq M_1)$ $V(M2 \geq M1)$ are needed.

Figure 1. The intersection between M_1 and M_2



Source: Chang (1996)

Step 3: The degree of possibility for a convex fuzzy number to be greater than the k convex numbers $M_i(i=1,2,...,k)$ can be defined by Expression (8):

$$\begin{aligned} &V(M \geq M_1, M_2, ..., M_k) \\ &V = V((M \geq M_1) and (M \geq M_2), ..., (M \geq M_k) \\ &V = \min V(M \geq M_i), i = 1,2,3,...,k \end{aligned} \quad (8)$$

Let us assume that Expression (9) is true:

$$d(A_i) = \min V(S_i \geq S_k) \quad (9)$$

for $k = 1,2,...,n; k \neq i$. The weight vector is obtained by Expression (10):

$$W' = (d'(A_1), d'(A_2, ..., d'(A_n))^T \quad (10)$$

Where $A_i(i=1,2,...,n)$ consists of *n* elements.

Step 4: Through normalization, the weight vectors are reduced to Expression (11):

$$W = (d(A_1), d(A_2, ..., d(A_n))^T \quad (11)$$

where W does not represent a fuzzy number.

In order to address the main deficiency of the classic AHP method, which is an insufficiently large scale of comparison, different comparison scales have been developed based on fuzzy triangle numbers. One of them, through which it is easier to evaluate the importance of criteria or alternatives, is *Chang scale (*Chang, 1996). Assessing the significance between pairs means that after ranking all correlation coefficients within the indicators, weight coefficients are determined (see Knežević et al., 2019; Mitrović et al., 2015; Mitrović et al., 2021)

VIKOR METHOD

The VIKOR method ("VlseKriterijumska Optimizacija I Kompromisno Resenje") is recognizable by its frequent use in multi-criteria ranking and its usefulness when it comes to finding solutions for various variants of decision-making problems (Rajković et al., 2020). The application of the VIKOR method for multi-criteria ranking is based on the Q_i metric presented as follows*:*

$$Q = \frac{s_j - s^*}{s^- - s^*}, R = \frac{R_j - R^*}{R^- - R^*}, Q_i = v^* \frac{s_j - s^*}{s^- - s^*} + (1-v)^* \frac{R_j - R^*}{R^- - R^*}, i = 1,2,m. \quad (12)$$

Otherwise, this method is distance-measure-based. The closest solution to an ideal is called a compromise solution or a viable solution. Further, according to the formula:

$$L_p(F^*,F)=\left\{\sum_{j=1}^{n}\left[f_j^*-f_j(x)^p\right]\right\}^{\frac{1}{p}},1\le p\le\alpha \qquad (13)$$

is pointed to the distance between ideal point F^* $F^*$the point *f*(*x*), in the criterion function space (Opricović, 1986).

First of all, it is pointed out that for each action there is a value of Qi, in order to determine afterwards which action is characterized by the smallest value, because that action is chosen. The next step is to calculate the measure for the multicriteria ranking of the i-th action (Qi) as follows:

$$Q=p^*QS_i+(1-p)^*QR_i \qquad (14)$$

where

$$Q=\frac{s_j-s^*}{s^-s^*},R=\frac{R_j-R^*}{R^--R^*} \qquad (15)$$

Minimizing the mentioned metric leads to finding a compromise solution. By applying the FAHP method, the weighting coefficients for the observed financial ratio (which represent the technique of financial analysis) in the financial performance segment (Mandić et al., 2014) are identified, so that in the next step, the VIKOR method is applied. The purpose of the VIKOR method is to evaluate companies using four rating criteria, with the ultimate goal of determining which company has the best financial performance. It is especially emphasized that the VIKOR method has a high utility value when it comes to decision-making problems related to conflicted and incommensurable criteria or when quantitative or qualitative criteria are considered (Muñoz-Medina et al., 2021).

Results and Discussion

At the beginning of presenting the results of the research, the weight coefficients are shown according to the types of financial ratios (Knežević et al., 2019), specifically for each of them (Table 2).

Table 2. Weight coefficients by types of ratio indicators.

Type of ratio	Name	Weight coefficient
Liquidity ratios	Cash-coverage ratio	0.496
	Acid test ratio	0.292
	Working capital ratio	0.118
	Net working capital	0.094

Type of ratio	Name	Weight coefficient
Profitability ratios	ROA	0.441
	ROE	0.280
	Profit margin ratio	0.112
	Operating margin ratio	0.168
Solvency ratios	Debt-to-Equity ratio	0.541
	Interest coverage ratio	0.224
	Debt ratio	0.131
	Equity ratio	0.104
Activity ratios	Collection period	0.339
	Days' sales in cash	0.409
	Days payable outstanding	0.126
	Total asset turnover	0.125

Source: Author's analysis

The next step determines the values of liquidity, profitability, solvency and activities ratios from 2015-2020, and according to the years of observed companies. Some of the companies in the particular year and particular indicators could not be ranked because they did not have a profit at the end of the year, or had no debts, so certain ratios could not be calculated. After receiving value results for all indicators for all 6 years, it was necessary to determine the rankings of companies for each specific indicator. Table 3 shows the rankings of companies by liquidity ratios.

Table 3. Company rankings according to liquidity indicator.

Company name	2015	2016	2017	2018	2019	2020
Agrobačka a.d. Bačka Topola	2	3	2	2	1	1
Jadran a.d. Nova Gajdobra	1	1	1	1	2	2
Omoljica a.d. Omoljica	14	14	13	14	5	3
Lučić Prigrevica a.d. Novi Sad	6	6	4	4	4	4
Mitrosrem a.d. Sremska Mitrovica	17	17	5	10	6	5
Sloga a.d. Kać	3	2	3	3	3	6
Stari Tamiš a.d. Pančevo	8	7	7	7	8	7
Borac a.d. Šurjan	9	10	11	9	10	8
PTK Panonija a.d. Panonija	11	11	10	8	13	9
Vojvodina a.d. Sombor	7	8	8	6	11	10
PP Miletić a.d. Sombor	10	9	9	5	12	11
Hajdučica a.d. Hajdučica	13	13	15	15	7	12
Nova Peščara a.d. Deliblato	5	5	12	11	14	13
PP Feketić a.d. Sombor	12	12	14	13	15	14
Irmovo a.d. Kisač	15	15	16	16	16	15
Bačka a.d. Sivac	18	18	6	12	9	16
Bajinovac a.d. Bajina Bašta	16	16	17	17	17	17
Sloga a.d. Banatski Karlovac	4	4	18	18	18	18

Source: Author's analysis

In the listed liquidity indicator table, the company Jadran a.d. Nova Gajdobra has the best rankings in all 6 years observed. In the following table there is a ranking of observed companies for profitability indicators.

Table 4. Company rankings according to profitability indicator.

Company name	2015	2016	2017	2018	2019	2020
Agrobačka a.d. Bačka Topola	17	15	17	17	17	16
Jadran a.d. Nova Gajdobra	16	16	16	15	16	17
Lučić Prigrevica a.d. Novi Sad	1	6	2	3	4	9
Mitrosrem a.d. Sremska Mitrovica	12	7	9	13	9	3
Sloga a.d. Kać	3	13	14	12	15	15
Stari Tamiš a.d. Pančevo	9	5	3	4	6	5
Borac a.d. Šurjan	11	1	7	5	2	4
PTK Panonija a.d. Panonija	7	10	8	10	3	1
Vojvodina a.d. Sombor	6	9	6	6	10	11
PP Miletić a.d. Sombor	4	3	1	2	11	10
Hajdučica a.d. Hajdučica	10	8	5	7	12	2
Nova Peščara a.d. Deliblato	14	11	10	9	8	12
PP Feketić a.d. Sombor	5	2	4	8	7	8
Irmovo a.d. Kisač	2	4	13	1	1	7
Bačka a.d. Sivac	15	14	11	11	14	14
Sloga a.d. Banatski Karlovac	8	17	15	16	5	6
Omoljica a.d. Omoljica	/	12	/	14	13	13
Bajinovac a.d. Bajina Bašta	/	/	/	0	0	0

Source: Author's analysis

Lucic Prigrevica a.d. Novi Sad has the best rankings in the table for the profitability indicator. Omoljica a.d. Omoljica and Bajinovac a.d. Bajina Bašta companies cannot be taken into account, because during some years they did not have sales revenues. Table 5 shows ranking of observed companies for activity indicators.

Table 5. Company rankings according to activity indicator.

Company name	2015	2016	2017	2018	2019	2020
Agrobačka a.d. Bačka Topola	16	16	15	15	15	14
Jadran a.d. Nova Gajdobra	15	14	16	16	16	15
Lučić Prigrevica a.d. Novi Sad	11	9	10	10	8	10
Mitrosrem a.d. Sremska Mitrovica	2	6	9	11	10	6
Sloga a.d. Kać	12	15	14	14	14	12
Stari Tamiš a.d. Pančevo	13	13	13	13	13	1
Borac a.d. Šurjan	9	4	5	5	4	8
PTK Panonija a.d. Panonija	10	10	8	9	9	7
Vojvodina a.d. Sombor	6	5	4	4	3	5
PP Miletić a.d. Sombor	4	7	6	7	6	4
Hajdučica a.d. Hajdučica	7	11	12	8	11	2
Nova Peščara a.d. Deliblato	14	12	11	12	12	13
PP Feketić a.d. Sombor	3	1	2	2	1	3
Irmovo a.d. Kisač	5	2	1	1	2	9
Bačka a.d. Sivac	8	8	7	6	7	11
Sloga a.d. Banatski Karlovac	1	3	3	3	5	16
Omoljica a.d. Omoljica	/	17	/	16	16	16
Bajinovac a.d. Bajina Bašta	/	/	/	16	16	16

Source: Author's analysis

Table 5 shows that PP Feketić a.d. Sombor has the best rankings for activity indicators. Omoljica a.d. Omoljica and Bajinovac a.d. Bajina Bašta companies cannot be taken into account, because during some years they did not have specific parameters for calculating activity ratios. Table 6 shows the company's solvency indicator rankings.

Table 6. Company rankings according to solvency indicator.

Company name	2015	2016	2017	2018	2019	2020
Agrobačka a.d. Bačka Topola	16	15	14	16	16	17
Jadran a.d. Nova Gajdobra	7	7	8	4	4	8
Lučić Prigrevica a.d. Novi Sad	1	2	6	7	8	7
Mitrosrem a.d. Sremska Mitrovica	11	10	9	9	10	12
Sloga a.d. Kać	10	8	7	8	9	10
Stari Tamiš a.d. Pančevo	3	3	1	1	1	3
Borac a.d. Šurjan	6	5	4	3	5	4
PTK Panonija a.d. Panonija	4	4	2	2	2	2
Vojvodina a.d. Sombor	15	14	16	15	14	15
PP Miletić a.d. Sombor	5	1	12	13	13	13
Hajdučica a.d. Hajdučica	2	13	15	11	3	1
Nova Peščara a.d. Deliblato	13	11	11	12	11	11
PP Feketić a.d. Sombor	8	9	13	14	14	14
Irmovo a.d. Kisač	12	12	10	10	12	9
Bačka a.d. Sivac	14	16	17	17	17	16
Sloga a.d. Banatski Karlovac	9	6	3	6	6	5
Omoljica a.d. Omoljica	/	0	/	5	7	6
Bajinovac a.d. Bajina Bašta	/	/	/	0	0	0

Source: Author's analysis

In Table 6 for the solvency indicator, Stari Tamiš a.d. Pančevo has the best ranking. Omoljica a.d. Omoljica and Bajinovac a.d. Bajina Bašta companies cannot be taken into account, because for some years they did not have specific parameters for calculating solvency ratios. The AHP method can be combined with the VIKOR method when we want to adapt AHP method to changes in the environment. The ratio numbers used in the AHP method are used to determine the significance of certain ratio numbers within a specific indicator. After the significance of ratio numbers and indicators have been obtained by using the AHP method, the VIKOR method is used to rank companies against the achieved results. As the significance of the indicator differs according to the user of the financial statements' information, this research uses the creditor's perspective. In this sense, the significance of the indicators can be seen in the following table.

Table 7. Significance of indicators.

Significance of indicators	Indicator
0.427	Liquidity
0.326	Profitability
0.156	Solvency
0.093	Activity

Source: Author's analysis

In the end, we get the following table that shows us, according to the values of the indicators, which companies have the highest rankings in relation to each other.

Table 8**.** Company rankings.

Company name	2015	2016	2017	2018	2019	2020
Stari Tamiš a.d. Pančevo	6	4	3	4	3	1
Mitrosrem a.d. Sremska Mitrovica	17	16	5	12	4	2
PTK Panonija a.d. Panonija	10	12	6	6	5	3
Hajdučica a.d. Hajdučica	14	15	16	15	6	4
Borac a.d. Šurjan	8	3	7	5	2	5
PP Miletić a.d. Sombor	4	2	2	2	15	6
Vojvodina a.d. Sombor	5	6	4	3	8	7
Lučić Prigrevica a.d. Novi Sad	2	1	1	1	1	8
PP Feketić a.d. Sombor	7	5	9	9	13	9
Irmovo a.d. Kisač	13	13	17	10	7	10
Sloga a.d. Kać	1	7	10	7	11	11
Agrobačka a.d. Bačka Topola	16	14	13	13	12	12
Jadran a.d. Nova Gajdobra	11	10	12	8	10	13
Omoljica a.d. Omoljica	15	17	14	17	9	14
Nova Peščara a.d. Deliblato	12	8	15	11	18	15
Bačka a.d. Sivac	18	18	8	16	16	16
Bajinovac a.d. Bajina Bašta	9	9	11	14	14	17
Sloga a.d. Banatski Karlovac	3	11	18	18	17	18

Source: Author's analysis

According to the analysis shown in the paper, and to the data from the financial statements, in years 2015-2020, the best companies were Stari Tamiš a.d. Pančevo, PP Miletić a.d. Sombor and Lučić Prigrevica a.d. Novi Sad.

Conclusions

Different models are used for decision-making, and their application is usually limited by the display of information in financial statements. The FAHP and VIKOR methods help users to make a decision and can be very useful for ranking and evaluating companies on that basis. The aim of this paper was to explore and rank the financial performance of companies operating within the A-agriculture, forestry and fisheries sector on the Belgrade Stock Exchange, using FAHP and VIKOR methods.

In today's turbulent and competitive environment, a company's performance evaluation and its comparison with other companies is an important issue for various interest groups and for various reasons. It is about reaching the various investment goals of investors and creditors, with a focus on long-term sustainable business.

The research and analyses presented in this work contribute to the expansion of existing literature for a number of reasons. The ranking of companies operating within the A-agriculture, forestry and fisheries sector listed on the Belgrade Stock Exchange

is presented and analysed, which can be used for further analysis of companies listed on this stock exchange, as well as for analysis of the entire Sector A. The results of the survey outspread previous research in this field. In addition, the work and research done in this paper have certain limitations, which also represent the possibilities of further research. Namely, the research was limited to one sector observed, in this case agriculture, forestry and fisheries, which can be extended to more or even all companies whose shares are listed on the Belgrade Stock Exchange. Likewise, the sample can be extended to all companies from sector A in the Republic of Serbia. Finally, further research may include more spatial and time-consuming samples.

Conflict of interests

The authors declare no conflict of interest.

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