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Araştırma Makalesi / Research Article

Determination of Performance Ranking of Participation Banks with CIRITIC-Based TOPSIS Method

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Abstract: Participation banks are an essential part of the financial sector and have a unique business model that differs from traditional banks. These banks operate based on Islamic finance principles and strive to provide interest-free and ethical financial services to customers. This study aims to evaluate the performance of five participation banks in Türkiye (Albaraka Bank, Kuveyt Türk Participation Bank, Türkiye Finans Participation Bank, Vakıf Participation Bank, Ziraat Participation Bank) using a multi-criteria decision-making technique called CRITIC-based TOPSIS. The study covers the data period of 2018-2022. The results indicate that Vakıf Participation Bank showed the highest performance in 2018, Ziraat Participation Bank in 2019-2020, and Kuveyt Türk Participation Bank in 2021-2022.

Keywords: *Participation Banking, Multi-Criteria Decision Making, CRITIC, TOPSIS*

1. Introduction

Banks are integral to the growth of economies, contributing significantly in various ways. The most significant contribution is their allocation of society's savings to productive investments and providing loans to productive sectors, leading to economic growth (Raharjo et al., 2014). Additionally, banks diversify their assets by effectively managing risks, contributing to the proper functioning of capital markets through the restructuring of bad loans (Sutjiati Njotoprajitno et al., 2020). Furthermore, banks play a crucial role in credit risk assessment and control, particularly in the digital transformation driven by big data (Liu et al., 2021).

The principles of Islamic finance, rooted in Islamic beliefs, form the foundation of Islamic banking and establish it as a crucial component of the global financial system. Islamic banks play a significant role in the conventional banking system by adhering to Islamic principles and offering unique financial products and services. Studies have shown that the participation funds and financing provided by Islamic banks have a notable impact on the deposits of conventional banks. Islamic banking offers a viable alternative for those seeking Sharia-compliant financial services that prohibit interest-based transactions. Organizations like the Accounting and Auditing Organisation for Islamic Financial Institutions (AAOIFI) and the Islamic Financial Services Board (IFSB) play a crucial role in regulating and supervising the development of Islamic banking. In recent years, Islamic banking has gained popularity, with researchers focusing on it as an important topic in Islamic finance. The small-scale and intensive activities of Islamic banks have the potential to contribute significantly to the economy.

According to Jubilee et al. (2021), social functions are becoming increasingly important in the financial sector. Islamic banks, with their adherence to Islamic principles, unique financial products and services, and impact on the conventional banking system, are crucial players in this space. Their compliance with Islamic law and regulatory standards, as well as their provision of equity-based financing, are just some of the factors that highlight their significance in the financial sector. Currently, Türkiye has six participation banks (known as Islamic banks) as of 2023, as reported by Dağılgan (2023). With the entry of public banks like Ziraat Bank and Vakıfbank into the participation banking sector, the industry has shown growth potential and increased importance, as per Eyceyurt Batır (2019). However, the share of participation in banking activities in Türkiye's financial sector still remains relatively low, highlighting the need for further development, as stated by Emek (2021).

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Multi-criteria decision-making (MCDM) methods are widely used in various sectors, including finance, banking, health, energy, production, and environmental sciences. In the banking sector, MCDM methods such as Analytical Hierarchy Process (AHP), Technique for Order Performance by Similarity to Ideal Solution (TOPSIS), and VlseKriterijumska Optimizacija I Kompromisno Resenje (VIKOR) are used for decision-making scenarios involving multiple criteria and conflicting objectives. These methods enable decision-makers to evaluate various criteria and prioritize alternatives according to their performance against these criteria.

Customer Relationship Management (CRM) has also gained importance in the banking sector. It is used for the evaluation of banks' performance, market concentration and competition analysis, vendor evaluation, investment decision-making, and Islamic banking services. The use of multi-criteria decision-making techniques such as AHP and TOPSIS in understanding customer preferences in Islamic banking and predicting efficiency in banking, including Islamic banks, has been demonstrated in various studies (Ayrıçay vd., 2017; Çağıran vd., 2019). In this study, the performances of five participation banks operating in Türkiye (Albaraka, Kuveyt Türk, Türkiye Finans, Vakıf, Ziraat Participation Banks) between 2018 and 2022 were analyzed with the CRITIC-based TOPSIS method, which is a multi-criteria decision-making technique. It is thought that using data for the 2018-2022 periods will allow a comprehensive evaluation of the long-term performances of participation banks. This evaluation process is expected to play an important role in understanding the dynamics of the industry. According to the study, Vakıf Participation, Ziraat Participation, and Kuveyt Türk Participation were the top-performing banks in 2018, 2019-2020, and 2021-2022, respectively. In the literature, no studies have been found in which the CIRITIC-based TOPSIS method was used for evaluating the performance of participation banks. In this respect, the study can be considered an original study aimed at evaluating the performance of participation banks.

The study consists of five parts. The first part is the introduction and contains basic information about the general structure and scope of the study. In the second part, a literature review is presented that examines the performance of participation banks and studies using multi-criteria decision-making techniques. In the third part, detailed information about the methods of the study is presented, and the methodologies used are clearly explained. The fourth part focuses on the applications made with the obtained data and the results of these applications. Finally, in the fifth and last part, the findings obtained based on the results of the applications are included and suggestions are made for the relevant stakeholders.

1.1. Literature review

Table 1 presents valuable insights into the performance of participation banks, assessed through multi-criteria decision-making techniques. The data year(s) column specifies the particular years of data utilized in each study, while the result column highlights the bank that demonstrated the most favorable performance, as determined by the analysis. It's worth mentioning that the studies included in Table 1 employed a wide variety of financial ratios as criteria.

Table 1

Literature Review

AUTHOR	YEAR	METHOD	Data Year(s)	CONCLUSION
Gezen	2019	Entropy and WASPAS	2010-2017	2010-2015: Türkiye Finance Participation Bank; 206-2017: KuveytTürk Participation Bank
Karakaya	2020	TOPSIS	2018	Kuveyt Turk
Kartal	2020	VIKOR	2017-2018	Kuveyt Turk
Çilek & Karavardar	2020	Multi-MOORA	2016-2018	Vakıf Participation Bank
Odabaş & Bozdoğan	2020	ELECTRE	2016-2018	Vakıf Participation Bank
Bayram	2021	CRITIC-EDAS	2010-2019	Ziraat Participation Bank
Bektas	2021	ENTROPY andMAIRCA	2018-2019	2018: Ziraat Participation; 2019:Kuveyt Türk
Gençtürk et al.	2021	MARCOS	2019.D3-2020.D4	Vakıf Participation Bank
Yetiz	2021	TOPSIS	2016-2019	2016: Vakif Participation; 2017:Kuvet Turk; 2018-2019: Türkiye Finans Participation
Özer & Saygın	2022	PROMETHEE	2011-2020	Kuveyt Turk
Yurttadur & Taşçı	2022	PIV	2019-2021	2019: Ziraat Participation; 2020-2021: Vakıf Participation
Dağlı & Kuvvetli	2023	CoCoSo	2018-2022	Kuveyt Turk
Şekkeli & Güçlü	2023	Grey Relational Analysis	2019-2021	Ziraat Participation Bank

Upon analysis of Table 1, it becomes evident that the top-performing banks vary depending on the data period and methods utilized in the study. The bank with the best performance may change according to the methods and periods used. For example, in the study conducted by Bektaş (2021), the bank with the best performance for 2019 was Kuvet Türk, while in the study conducted by Yurttadur and Taşçı (2022), it was Ziraat Katılım bank. It is estimated that this situation is due to the fact that different methods were used. However, overall, it can be concluded that Kuveyt Türk Participation Bank consistently ranks as the best-performing bank, despite the fluctuations in data period, methods, and criteria employed. In addition to Kuveyt Türk Katılım Bank, Ziraat and Vakıf Katılım banks are among the other best-performing banks.

2. Method

In the realm of multi-criteria decision-making (MCDM) methods, the CRITIC approach holds great significance. Its purpose is to objectively ascertain weights in multi-criteria problems, as noted by Diakoulaki et al. (1995). The CRITIC method is particularly useful in tackling the challenge of identifying objective weights necessary for ranking and selecting the optimal solutions for CRM problems, according to Nabavi et al. (2023). Moreover, the approach assists with managing complicated decision-making problems involving conflicting objectives and high uncertainty, as stated by Razmak and Aouni (2015). The CRITIC method is a valuable tool by providing a systematic framework for evaluating alternatives and determining weights. The process of determining criteria weights using the CRITIC method involves five stages, as outlined in Table 2, alongside their corresponding equations (Alinezhad and Khalili, 2019).

Table 2

CRITIC Method Stages

Phase	Description	Equation
1	Creation of the decision matrix	$X = \begin{matrix} A_1 \\ A_2 \\ \dots \\ A_4 \end{matrix} \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1n} \\ x_{21} & x_{12} & \ddots & x_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ x_{m1} & x_{m2} & \cdots & x_{mn} \end{bmatrix}$
2	The decision matrix is normalised and Equation (a) is used for benefit-based criteria and Equation (b) for cost-based criteria	$a.)\quad x_{ij} = \frac{r_{ij} - r_i^-}{r_i^+ - r_i^-};\quad i = 1, \dots, m, j = 1, \dots, n$ $b.)\quad x_{ij} = \frac{r_{ij} - r_i^+}{r_i^- - r_i^+};\quad i = 1, \dots, m, j = 1, \dots, n$
3	Creation of CorrelationCoefficient Matrix	$\rho_{jk} = \frac{\sum_{i=1}^{m}\left(r_{ij} - \overline{r_j}\right)\left(r_{ik} - \overline{r_k}\right)}{\sqrt{\sum_{i=1}^{m}\left(r_{ij} - \overline{r_j}\right)^2 \sum_{i=1}^{m}\left(r_{ik} - \overline{r_k}\right)^2}}$
4	Calculation of C $_j$	$C_j = \sigma_j \sum_{k=1}^{n}\left(1 - t_{jk}\right), \mathrm{j} = 1,2,\dots, \mathrm{n}$ $\sigma_j = \sqrt{\sum_{i=1}^{m}\left(r_{ij} - \bar{r}_j\right)^2 / m}$
5	Calculation of CriterionWeights	$w_j = \frac{C_j}{\sum_{j=1}^{n} C_j};\quad j = 1, \dots, n$

The TOPSIS (Technique for Order Preference by Similarity to Ideal Solution) method has been widely utilized in several fields, including economics, geography, computer science, and mathematics, since its inception in 1981 by Hwang and Yoon (Mishra et al., 2017). As proposed by the European Commission, the TOPSIS method (Chang et al., 2010) evaluates weighted distances to determine the relative distances to ideal and anti-ideal solutions for each alternative.

TOPSIS is a versatile MCDM method successfully implemented in various disciplines, proving effective in decision-making processes and problem-solving. It has been utilized in various applications, including material selection (Shanian & Savadogo, 2006), ranking of evolutionary algorithms (Krohling & Pacheco, 2015), personalized product evaluation (Quan et al., 2019), and lightweight optimization design in automotive engineering (Wang & Wang, 2019). The TOPSIS method is commonly used to determine criteria weights for MCDM, and its seven-stage process for weight determination is detailed in Table 3, along with their respective equations (Atan & Altan, 2020).

Table 3

TOPSIS Method Stages

Phase	Description	Equation
1	Creation of the decisionmatrix	$D = \begin{matrix} \\ A_1 \\ \vdots \\ A_i \\ \vdots \\ A_m \end{matrix} \begin{bmatrix} c_1 & c_2 & \cdots & c_n \\ d_{11} & d_{12} & \cdots & d_{1n} \\ \vdots & \vdots & \vdots & \vdots \\ d_{i1} & d_{i2} & \cdots & d_{in} \\ \vdots & \vdots & \vdots & \vdots \\ d_{m1} & d_{m2} & \cdots & d_{mn} \end{bmatrix} = [d_{ij}]_{m\times n}$ $r_{ij} = \frac{d_{ij}}{\sqrt{\sum_{k=1}^{m} d_{kj}^2}}\ ,\ \forall d_{ij} \neq 0\ and\ \forall i \in I_m\ ,\ \forall j \in I_m$
2	Normalisation of thedecision matrix	$R = \begin{bmatrix} r_{11} & r_{12} & \cdots & r_{1n} \\ r_{21} & r_{22} & \cdots & r_{2n} \\ \vdots & \vdots & \cdots & \vdots \\ r_{m1} & r_{m2} & \cdots & r_{mn} \end{bmatrix} = [r_{ij}]_{m\times n}$
3	Finding Relative Importance Degrees	$W = \begin{bmatrix} c_1 & c_2 & \cdots & c_n \\ w_1 & w_2 & \cdots & w_n \end{bmatrix} = [w_j]_{1\times n}$
4	Creation of a Weighted Normalised DecisionMatrix	$V = \begin{bmatrix} v_{11} & v_{12} & \cdots & v_{1n} \\ v_{21} & v_{22} & \cdots & v_{2n} \\ \vdots & \vdots & \cdots & \vdots \\ v_{m1} & v_{m2} & \cdots & v_{mn} \end{bmatrix} = [v_{ij}]_{m\times n}$
5	Determination of Ideal andNegative Ideal Solutions	$A^+ = \{v_1^+, \cdots, v_j^+, \cdots, v_n^+\} = \{\left(\underset{i}{max} v_{ij} \middle| j \in J_1\right), \left(\underset{i}{min} v_{ij} \middle| j \in J_2\right), i \in I_m\}$ $A^- = \{v_1^-, \cdots, v_j^-, \cdots, v_n^-\} = \{\left(\underset{i}{min} v_{ij} \middle| j \in J_1\right), \left(\underset{i}{max} v_{ij} \middle| j \in J_2\right), i \in I_m\}$
6	Calculation of Distances ofAlternatives to Ideal and Negative Ideal Solutions	$S_i^+ = \sqrt{\sum_{j=1}^{n} \left(v_{ij} - v_j^+\right)^2}, \quad \forall i \in I_m$ $S_i^- = \sqrt{\sum_{j=1}^{n} \left(v_{ij} - v_j^-\right)^2}, \quad \forall i \in I_m$
7	Calculation of RankingPoints	$C_i^+ = \frac{S_i^+}{(S_i^+ + S_i^-)}\ ,\ 0 \leq C_i^+ \leq 1\ ,\ \forall i \in I_m$

3. Implementation

The research study involved the utilization of data from five distinct banks that are currently operational in Türkiye. A comprehensive analysis of the banks and the evaluation criteria employed in the application can be found in Table 4.

Table 4

Alternatives and Criteria

ALTERNATIVES	ABBREVIATIONS	CRITERIA	ABBREVIATIONS
Albaraka Türk	A1	Capital AdequacyRatio	K1
Kuveyt Türk	A2	Return on AverageAssets	K2
Turkiye Finance	A3	Return on AverageEquity	K3
Vakif	A4	Total Loans/TotalAssets	K4
Ziraat	A5	Shareholders' Equity / Total Assets	K5
		TL Assets/TotalAssets	K6
		FX Assets/TotalAssets	K7

These ratios were chosen for the purpose of the study to evaluate bank performances, and they offer a broad perspective. The common feature of these ratios is that they are financial ratios that are widely used to measure the financial performance of banks and take into account different aspects.

The study initially involved determining the criteria weights for each year using the CRITIC method. Subsequently, the TOPSIS approach was applied based on the obtained criteria weights. The following section outlines the various stages of the application process. For reference, Table 5 provides each bank's decision matrices spanning 2018-2022.

Table 5

Decision Matrices

		K1	K2	K3	K4	K5	K6	K7
	Alternative Direction	*max*	*max*	*max*	*max*	*max*	*max*	*max*
2018	**A1**	0,147	0,003	0,041	0,620	0,077	0,514	0,486
	A2	0,177	0,012	0,160	0,618	0,073	0,505	0,495
	A3	0,166	0,009	0,103	0,634	0,092	0,577	0,423
	A4	0,136	0,016	0,213	0,644	0,073	0,536	0,464
	A5	0,128	0,015	0,145	0,799	0,100	0,651	0,349
2019	**A1**	0,150	0,001	0,017	0,596	0,074	0,473	0,527
	A2	0,193	0,011	0,163	0,529	0,065	0,389	0,611
	A3	0,173	0,007	0,078	0,621	0,092	0,461	0,539
	A4	0,149	0,011	0,166	0,613	0,065	0,443	0,557
	A5	0,166	0,014	0,163	0,712	0,087	0,571	0,429
2020	**A1**	0,135	0,004	0,063	0,607	0,058	0,442	0,558
	A2	0,213	0,009	0,175	0,486	0,052	0,482	0,518
	A3	0,166	0,008	0,123	0,578	0,068	0,482	0,518
	A4	0,185	0,013	0,139	0,548	0,090	0,455	0,545
	A5	0,148	0,011	0,810	0,635	0,013	0,588	0,412
2	**A1**	0,149	0,003	0,023	0,544	0,042	0,301	0,699

	A2	0,231	0,033	0,239	0,439	0,041	0,345	0,655
	A3	0,179	0,010	0,140	0,520	0,057	0,398	0,602
	A4	0,183	0,007	0,144	0,557	0,086	0,346	0,654
	A5	0,140	0,006	0,129	0,596	0,044	0,468	0,532
	A1	0,149	0,009	0,168	0,510	0,055	0,453	0,547
	A2	0,275	0,037	0,489	0,460	0,075	0,461	0,539
2022	**A3**	0,211	0,019	0,262	0,524	0,072	0,549	0,451
	A4	0,172	0,025	0,250	0,622	0,101	0,561	0,439
	A5	0,154	0,018	0,338	0,592	0,053	0,586	0,414

Normalised decision matrices were created following the creation of the decision matrices according to the CRITIC method. Table 6 shows the normalised decision matrix.

Table 6

Normalised Decision Matrix

		K1	**K2**	**K3**	**K4**	**K5**	**K6**	**K7**
	A1	0,386	0,000	0,000	0,013	0,161	0,060	0,940
	A2	1,000	0,692	0,691	0,000	0,014	0,000	1,000
	A3	0,785	0,508	0,359	0,088	0,701	0,493	0,507
2018	**A4**	0,171	1,000	1,000	0,142	0,000	0,213	0,787
	A5	0,000	0,920	0,607	1,000	1,000	1,000	0,000
	A1	0,020	0,000	0,000	0,368	0,355	0,462	0,538
	A2	1,000	0,724	0,980	0,000	0,026	0,000	1,000
	A3	0,536	0,461	0,414	0,506	1,000	0,400	0,600
2019	**A4**	0,000	0,731	1,000	0,457	0,000	0,298	0,702
	A5	0,387	1,000	0,983	1,000	0,816	1,000	0,000
	A1	0,000	0,000	0,000	0,810	0,586	0,000	1,000
	A2	1,000	0,622	0,150	0,000	0,511	0,275	0,725
	A3	0,404	0,522	0,080	0,617	0,705	0,271	0,729
2020	**A4**	0,640	1,000	0,102	0,412	1,000	0,084	0,916
	A5	0,166	0,782	1,000	1,000	0,000	1,000	0,000
	A1	0,097	0,000	0,000	0,672	0,029	0,000	1,000
	A2	1,000	1,000	1,000	0,000	0,000	0,265	0,735
	A3	0,424	0,246	0,544	0,520	0,350	0,578	0,422
2021	**A4**	0,473	0,144	0,559	0,750	1,000	0,271	0,729
	A5	0,000	0,084	0,492	1,000	0,063	1,000	0,000
	A1	0,000	0,000	0,000	0,310	0,045	0,000	1,000
	A2	1,000	1,000	1,000	0,000	0,451	0,057	0,943
	A3	0,493	0,356	0,293	0,400	0,406	0,726	0,274
2022	**A4**	0,183	0,583	0,256	1,000	1,000	0,813	0,187
	A5	0,043	0,319	0,528	0,819	0,000	1,000	0,000

After the formation of normalised decision matrices, the relationship coefficient matrices in the next stage of the CRITIC method were formed.

Table 7

Relationship Coefficient Matrices

		K1	K2	K3	K4	K5	K6	K7
2018	K1	1,000	-0,300	-0,161	-0,683	-0,335	-0,558	0,558
	K2	-0,300	1,000	0,937	0,490	0,161	0,432	-0,432
	K3	-0,161	0,937	1,000	0,189	-0,190	0,095	-0,095
	K4	-0,683	0,490	0,189	1,000	0,781	0,917	-0,917
	K5	-0,335	0,161	-0,190	0,781	1,000	0,939	-0,939
	K6	-0,558	0,432	0,095	0,917	0,939	1,000	-1,000
	K7	0,558	-0,432	-0,095	-0,917	-0,939	-1,000	1,000
2019	K1	1,000	0,361	0,361	-0,406	0,041	-0,381	0,381
	K2	0,361	1,000	0,945	0,384	0,021	0,259	-0,259
	K3	0,361	0,945	1,000	0,116	-0,295	-0,018	0,018
	K4	-0,406	0,384	0,116	1,000	0,657	0,962	-0,962
	K5	0,041	0,021	-0,295	0,657	1,000	0,651	-0,651
	K6	-0,381	0,259	-0,018	0,962	0,651	1,000	-1,000
	K7	0,381	-0,259	0,018	-0,962	-0,651	-1,000	1,000
2020	K1	0,525	1,000	0,387	-0,252	0,084	0,380	-0,380
	K2	-0,268	0,387	1,000	0,526	-0,848	0,975	-0,975
	K3	-0,946	-0,252	0,526	1,000	-0,479	0,453	-0,453
	K4	0,342	0,084	-0,848	-0,479	1,000	-0,864	0,864
	K5	-0,185	0,380	0,975	0,453	-0,864	1,000	-1,000
	K6	0,185	-0,380	-0,975	-0,453	0,864	-1,000	1,000
	K7	0,525	1,000	0,387	-0,252	0,084	0,380	-0,380
2021	K1	1,000	0,920	0,824	-0,911	0,074	-0,342	0,342
	K2	0,920	1,000	0,855	-0,910	-0,279	-0,151	0,151
	K3	0,824	0,855	1,000	-0,630	0,053	0,232	-0,232
	K4	-0,911	-0,910	-0,630	1,000	0,265	0,458	-0,458
	K5	0,074	-0,279	0,053	0,265	1,000	-0,114	0,114
	K6	-0,342	-0,151	0,232	0,458	-0,114	1,000	-1,000
	K7	0,342	0,151	-0,232	-0,458	0,114	-1,000	1,000
2022	K1	1,000	0,846	0,801	-0,681	0,270	-0,376	0,376
	K2	0,846	1,000	0,868	-0,261	0,537	-0,094	0,094
	K3	0,801	0,868	1,000	-0,404	0,060	-0,105	0,105
	K4	-0,681	-0,261	-0,404	1,000	0,331	0,824	-0,824
	K5	0,270	0,537	0,060	0,331	1,000	0,197	-0,197
	K6	-0,376	-0,094	-0,105	0,824	0,197	1,000	-1,000
	K7	0,376	0,094	0,105	-0,824	-0,197	-1,000	1,000

Finally, criterion weights were calculated. Table 8 shows the weight of each criterion according to years. TOPSIS application was performed with the weights obtained.

Table 8

Criteria Weights

Years	K1	K2	K3	K4	K5	K6	K7
2018	0,179	0,108	0,113	0,127	0,145	0,121	0,207
2019	0,149	0,103	0,141	0,120	0,162	0,128	0,197
2020	0,140	0,110	0,144	0,154	0,141	0,138	0,172
2021	0,119	0,130	0,103	0,181	0,148	0,157	0,161
2022	0,120	0,091	0,107	0,172	0,118	0,183	0,208

In the second part of the application, the TOPSIS application was carried out according to the criteria weights determined by the CRITIC method. Firstly, a weighted normalised decision matrix was created according to the determined criteria weights. Table 9 shows the weighted normalised decision matrices.

Table 9

Weighted Normalised Decision Matrices

		K1	K2	K3	K4	K5	K6	K7
2018	A1	0,077	0,013	0,014	0,053	0,060	0,050	0,101
	A2	0,093	0,048	0,056	0,053	0,057	0,049	0,103
	A3	0,088	0,039	0,036	0,054	0,071	0,056	0,088
	A4	0,072	0,064	0,074	0,055	0,056	0,052	0,096
	A5	0,067	0,060	0,051	0,068	0,077	0,063	0,072
2019	A1	0,060	0,006	0,008	0,052	0,070	0,058	0,087
	A2	0,077	0,050	0,078	0,046	0,061	0,047	0,100
	A3	0,069	0,034	0,037	0,054	0,086	0,056	0,088
	A4	0,059	0,050	0,079	0,053	0,060	0,054	0,091
	A5	0,066	0,067	0,078	0,062	0,081	0,070	0,070
2020	A1	0,049	0,019	0,011	0,073	0,060	0,056	0,084
	A2	0,078	0,048	0,030	0,059	0,054	0,061	0,078
	A3	0,061	0,044	0,021	0,070	0,069	0,060	0,078
	A4	0,068	0,066	0,023	0,066	0,092	0,057	0,082
	A5	0,054	0,056	0,137	0,077	0,013	0,074	0,062
2021	A1	0,044	0,012	0,007	0,083	0,050	0,056	0,080
	A2	0,069	0,119	0,073	0,067	0,048	0,065	0,075
	A3	0,053	0,038	0,043	0,079	0,066	0,074	0,069
	A4	0,054	0,027	0,044	0,085	0,100	0,065	0,075
	A5	0,042	0,021	0,039	0,090	0,051	0,088	0,061
2022	A1	0,041	0,016	0,025	0,072	0,040	0,071	0,106
	A2	0,075	0,063	0,073	0,065	0,054	0,072	0,104
	A3	0,057	0,033	0,039	0,074	0,052	0,086	0,087
	A4	0,047	0,044	0,038	0,088	0,072	0,088	0,085
	A5	0,042	0,031	0,051	0,084	0,038	0,092	0,080

Following the creation of weighted normalised decision matrices, positive and negative ideal solution tables were created for each year. Table 10 shows the positive and negative ideal solution tables.

Table 10

Positive and Negative Ideal Solution Tables

	2018				2019				2020		
	Si+	Si-	Ci		Si+	Si-	Ci		Si+	Si-	Ci
A1	0,085	0,070	0,455	A1	0,085	0,070	0,455	A1	0,085	0,070	0,455
A2	0,038	0,102	0,727	A2	0,038	0,102	0,727	A2	0,038	0,102	0,727
A3	0,051	0,085	0,623	A3	0,051	0,085	0,623	A3	0,051	0,085	0,623
A4	0,035	0,101	0,741	A4	0,035	0,101	0,741	A4	0,035	0,101	0,741
A5	0,046	0,086	0,649	A5	0,046	0,086	0,649	A5	0,046	0,086	0,649

	2021				2022		
	Si+	Si-	Ci		Si+	Si-	Ci
A1	0,085	0,070	0,455	A1	0,085	0,070	0,455

A2	0,038	0,102	0,727	**A2**	0,038	0,102	0,727
A3	0,051	0,085	0,623	**A3**	0,051	0,085	0,623
A4	0,035	0,101	0,741	**A4**	0,035	0,101	0,741
A5	0,046	0,086	0,649	**A5**	0,046	0,086	0,649

The Ci values in Table 10 show the distances to the ideal solution. The highest Ci value represents the alternative with the highest performance. Table 11 shows the banks according to their performance ranking.

Table 11

Performance Ranking

Rank	2018	2019	2020	2021	2022
1	VAKIF	ZİRAAT	ZİRAAT	KUVEYT TÜRK	KUVEYT TÜRK
2	KUVEYT TÜRK	KUVEYT TÜRK	VAKIF	VAKIF	VAKIF
3	ZİRAAT	VAKIF	KUVEYT TÜRK	TÜRKİYE FINANCE	TÜRKİYE FINANCE
4	TÜRKİYE FINANCE	TÜRKİYE FINANCE	TÜRKİYE FINANCE	ZİRAAT	ZİRAAT
5	ALBARAKA TÜRK	ALBARAKA TÜRK	ALBARAKATÜRK	ALBARAKATÜRK	ALBARAKA TÜRK

In Table 11, banks are ranked according to their performance in 2018-2022 according to the TOPSIS method. Accordingly, the bank with the highest performance is Vakıf Participation for 2018, Ziraat Participation for 2019-2020 and Kuveyt Türk Participation for 2021-2022.

4. Conclusion

This study analyzed the performance of five banks - Vakıf, Kuveyt Türk, Ziraat Participation Bank, Türkiye Finance, and Albaraka Türk Participation Banks - for several years. The study first determined CRITIC-based criterion weights and then applied the TOPSIS method based on these criteria weights to rank the banks by performance. Ultimately, the present study found that Vakıf Participation Bank had the highest performance in 2018. Çilek and Karavardar (2020); In the studies conducted by Odabaş and Bozdoğan (2020), the bank with the best performance in 2018 was determined to be Vakıf Bank, Ziraat Participation Bank in 2019-2020. Eid (2021); Yurttadur and Taşçı (2022); In the studies conducted by Şekkeli and Güçlü (2023), Ziraat Katılım Bank is the bank with the best performance for the same periods. Kuveyt Türk Participation Bank in 2021-2022, as determined by the evaluation conducted during that period. In the study conducted by Dağlı and Güçlü (2023), the bank with the best performance for the same period is Kuveyt Türk Katılım Bank.

Overall, Vakıf Participation, Ziraat Participation, and Kuveyt Türk Participation banks have consistently demonstrated exceptional performance across all years. Notably, Kuveyt Türk Participation Bank has consistently secured the top two positions in all years. Conversely, Albaraka Türk Participation Bank has consistently exhibited the lowest performance across all years.

By employing the CRITIC-based TOPSIS method in evaluating participation banks, we have identified those with the most successful and weakest performance from 2018-2022. This ranking can offer

valuable guidance to individuals and organizations seeking to achieve their financial objectives. With such performance assessments, decision-makers can adopt an informed approach in selecting a financial partner, leading to a more robust basis for the decision-making process. Armed with this information, individuals and institutions can make more informed financial choices and build stronger relationships with the participating banks they choose.

The research results offer several recommendations for interested parties. Researchers can use multi-criteria decision-making methods to evaluate the performance of participation banks and monitor changes in the sector. These methods can help determine the strengths and weaknesses of participation banks and identify trends in the sector. Policymakers can provide incentives to spread the successful practices of the best-performing participation banks to other banks. These incentives can increase productivity across the industry by encouraging the adoption of innovative practices. Additionally, policymakers can work to understand the reasons for poorly performing participation banks and take appropriate measures. Financial decision-makers and consumers can take such performance evaluations into account when choosing participation banks. They can make more informed choices by considering the reliability and successful practices of banks with good performance. This way, financial decision-makers and consumers can build more solid and sustainable financial relationships.

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