International Market Selection Based on Integrated MCDM Methods: A Case Study of Iron and Steel Sector

Entegre ÇKKV Yöntemlerine Dayalı Uluslararası Pazar Seçimi: Demir Çelik Sektörü Üzerine Bir Çalışma

Emre Kadir ÖZEKENCİ [*]

ABSTRACT

International Market Selection (IMS) is crucial for companies seeking growth and expansion beyond their domestic boundaries. IMS is a strategic decision that requires careful evaluation of several factors to minimize risks and achieve long-term success in international markets. Accordingly, this study aims to find out optimal market alternatives for exporter companies operated in iron and steel sector. A total of twenty-three market alternatives were evaluated based on ten criteria. The alternatives and criteria were determined by literature review and expert opinions. The weight of criteria was calculated by the FUCOM and LOPCOW methods. Once the weight of criteria was determined, the alternatives were ranked using the SPOTIS, RSMVC, CoCoSo and Borda Count methods. The results showed that balance of trade and GDP were the most and least important criteria, respectively. Overall results revealed that Canada, the UAE, Germany, Japan and Malaysia were the best market alternatives, while Venezuela, Mexico, Peru, Colombia and the UK were the worst market alternatives for iron and steel exporter companies. Additionally, the sensitivity analysis was carried out to observe the robustness of the results.

KEYWORDS

IMS, Iron and steel sector, Exports, MCDM

ÖZ

Uluslararası Pazar Seçimi (UPS), yerel sınırlarının ötesinde büyüme ve genişleme arayan şirketler için çok önemlidir. UPS, riskleri en aza indirmek ve uluslararası pazarlarda uzun vadeli başarı elde etmek için çeşitli faktörlerin dikkatli bir şekilde değerlendirilmesini gerektiren stratejik bir karardır. Bu doğrultuda, bu çalışmada demir-çelik sektöründe faaliyet gösteren ihracatçı firmalar için en uygun pazar alternatiflerinin ortaya çıkarılması amaçlanmıştır. Toplam yirmi üç pazar alternatifi on kritere göre değerlendirilmiştir. Alternatifler ve kriterler literatür taraması ve uzman görüşleri doğrultusunda belirlenmiştir. Kriter ağırlıkları, FUCOM ve LOPCOW yöntemleri ile hesaplanmıştır. Kriterlerin ağırlığı belirlendikten sonra alternatifler SPOTIS, RSMVC, CoCoSo ve Borda Sayım yöntemleri kullanılarak sıralanmıştır. Sonuçlar, ticaret dengesi ve GSYİH'nın sırasıyla en önemli ve en az önemli kriterler olduğunu göstermiştir. Genel sonuçlar, Kanada, BAE, Almanya, Japonya ve Malezya'nın en iyi pazar alternatifleri olduğunu, Venezuela, Meksika, Peru, Kolombiya ve İngiltere'nin demir çelik ihracatçısı şirketler için en kötü pazar alternatifleri olduğunu ortaya koymuştur. Buna ek olarak, sonuçların tutarlılığını gözlemlemek için duyarlılık analizi yapılmıştır.

ANAHTAR KELİMELER

UPS, Demir ve çelik sektörü, İhracat, ÇKKV

Makale Geliş Tarihi / Submission Date 22.02.2024	*Makale Kabul Tarihi / Date of Acceptance* 21.03.2024
Atıf	Özekenci, E. K. (2024). International Market Selection Based on Integrated MCDM Methods: A Case Study of Iron and Steel Sector. *Selçuk Üniversitesi Sosyal Bilimler Meslek Yüksekokulu Dergisi*, 27 (1), 274-293.

[*] Dr. Öğr. Üyesi, Çağ Üniversitesi, ekadirozekenci@cag.edu.tr, ORCID: 0000-0001-6669-0006

INTRODUCTION

In today's business landscape, operations are conducted within a globalized framework characterized by reduced barriers, heightened competition, and expansive opportunities for international growth. Prior to expanding internationally, a business must make several strategic decisions, including selecting which international markets are worth entering (Papadopoulos & Martín, 2011; Górecka & Szałucka, 2013). Businesses aiming to enter international markets are endeavoring to scrutinize and evaluate essential market entry strategies, while also taking into account the distinctiveness and attributes of local markets, including considerations such as legal, cultural, and economic suitability for the enterprise. Furthermore, every export market possesses distinct economic, cultural, and institutional frameworks that diverge from those of a firm's domestic market (He et al., 2016). Selecting the right international markets is a crucial aspect of foreign entry strategy, as it significantly impacts on export performance and competitive positioning (Papadopoulos et al., 2002). However, IMS poses significant challenges for many companies due to its complexity, time-consuming nature, the multitude of available options and conflicting goals (Aghdaie et al., 2011). Moreover, entering the new international market can be costly and risky, and the main reason for export failure is inadequate market selection (Papadopoulos & Denis 1988; Rahman, 2003). Hence, evaluation and selection of IMS can be seen as a MCDM problem. Evaluating and selecting international market is complicated because the decision-making process needs to take into account multiple criteria. MCDM methods address the challenge of selecting the best option when there are multiple, often conflicting, decision criteria to consider. (Aghdaie et al., 2013).

Over the last decades, MCDM methods have been widely used to select the best target market for companies (Górecka & Szałucka, 2013; Aghdaie & Alimardani, 2015; Cano et al., 2017; Vanegas-López et al., 2021; Günay & Toksöz, 2023). Accordingly, the current study aims to find out optimal market alternatives for exporter companies using the hybrid MCDM methods. In this paper, a new model was proposed involves both subjective (FUCOM) and objective (LOPCOW) weighting methods. Along with this, the weights of criteria were combined with Aggregated Weighting Method (AWM). Additionally, latest MCDM methods namely SPOTIS, RSMVC and CoCoSo were used to evaluate the international target market for exporter companies. Borda count method was applied to obtain the overall results. For this investigation, target markets were selected from list which is published by Republic of Türkiye Ministry of Trade in 2023. To the best of author's knowledge, this is the first study to assess the international target market for exporter companies in iron and steel sector using the FUCOM and LOPCOW-based SPOTIS, RSMVC and CoCoSo methods. Previous research reported that limited number of studies have investigated IMS for iron and steel sector using MCDM methods. However, no study has been conducted both objective and subjective approaches, and latest ranking methods such as SPOTIS and RSMVC. Thus, this study aims to address the research gap by proposing a new model for exporter companies.

The rest of the current study is structured as follows: Section two provides a summary of relevant studies. Section three describes the methodology used in this study. Section four outlines the results obtained from the proposed model. Section five concludes the paper.

1. LITERATURE REVIEW

This section presents the previous research on relevant field. Table 1 demonstrates a brief summary of the previous research on international market selection based on various MCDM methods.

Table 1. Overview of Previous Research

Author(s)	Year	Methods	Topics
Aghdaie et al.	2011	Fuzzy AHP-Fuzzy TOPSIS	A Hybrid Fuzzy MCDM Approach for Market Segments Evaluation and Selection
Górecka & Szałucka	2013	EXPROM II	Country Market Selection in International Expansion Using Multicriteria Decision Aiding Methods
Mobin et al.	2014	Shannon Entropy, SAW, TOPSIS, VIKOR	Food Product Target Market Prioritization Using MCDM Approaches
Aghdaie & Alimardani	2015	AHP-TOPSIS	Target Market Selection Based on Market Segment Evaluation: A Multiple Attribute Decision Making Approach

Yavuz	2016	PROMETHEE & Entropy	A Multiple Criteria Analysis Based on PROMETHEE and Entropy Methods for Geographic Market Selection: An Application in Furniture Industry
Yılmaz et al.	2017	AHP-VIKOR	Target Market Selection for Furniture Companies with the Multiple Criteria Decision-Making Approach
Tosun	2017	Fuzzy VIKOR	Target Market Selection in Fresh Fruit-Vegetable Sector Using Fuzzy VIKOR Method
Cano et al.	2017	Fuzzy weighting-Monte Carlo Simulation	International Market Selection Using Fuzzy Weighing and Monte Carlo Simulation
Oey et al.	2018	AHP-GP	Evaluating International Market Selection with Multi-Criteria Decision-Making Tools - A Case Study of a Metal Company in Indonesia
Ünal & İpekçi Çetin	2019	AHP-TOPSIS	Integrated AHP-TOPSIS Method For Fertilizer Producer's Target Market Selection
Sukoroto et al.	2020	AHP	Target Market Selection Using MCDM Approach: A Study of Rolling Stock Manufacturer
Çalık	2020	BWM-ARAS	A Hybrid BWM-ARAS Decision Making Model for Target Market Selection
Zolfani et al.	2021	MABA-EDAS	International Market Selection: A MABA Based EDAS Analysis Framework: A Case Study of Food Exporter Company
Vanegas-López et al.	2021	AHP-TOPSIS	International Market Selection: An Application of Hybrid Multi-Criteria Decision-Making Technique in the Textile Sector
Fidan	2021	CRITIC-MAIRCA	International Target Market Selection with CRITIC and MAIRCA Multi-Criteria Decision-Making Method
Günay & Toksöz	2023	IDOCRIW-MAIRCA	Multi-Criteria Decision Making in Determining an International Target Market in Tourism: The Case of Türkiye

It can be seen above (Table 1), MCDM methods are widely used by exporting companies to determine the international target market. So far, various MCDM methods have been applied to find out the optimal international market for companies. For instance, food industry (Mobin et al., 2014; Zolfani et al., 2021), furniture industry (Yavuz, 2016; Yılmaz et al., 2017), metal industry (Oey et al., 2018), agriculture industry (Ünal & İpekçi Çetin, 2019), textile industry (Vanegas-López et al., 2021) have been investigated by many researchers. Surprisingly, much of the current literature was carried out by AHP method (Aghdaie et al. 2011; Aghdaie & Alimardani, 2015; Yılmaz et al., 2017; Oey et al., 2018; Ünal & İpekçi Çetin, 2019; Sukoroto et al., 2020; Vanegas-López et al., 2021). Besides that, no previous study has determined the international target market using both subjective (AHP, SWARA, LBWA, FUCOM, etc.) and objective methods (CRITIC, ENTROPY, IDOCRIW, LOPCOW, MEREC, etc.). This study therefore set out to assess the international target market using both subjective and objective methods. Correspondingly, a new model which involves the FUCOM and LOPCOW-based SPOTIS, RSMVC, CoCoSo and Borda Count methods was proposed to determine the optimal international market for exporter companies operated in iron and steel industry.

2. METHODOLOGY

2.1. FUCOM Method

Full Consistency Method (FUCOM) was proposed by Pamučar, Stević and Sremac in 2018. It's one of the recent approaches used in subjective weighting methods. The steps of the FUCOM method are shown below:

Step 1. Expert ranking of criteria

Step 2. Determining the vectors indicating the relative importance of evaluation criteria.

Step 3. Specifying the constraints of a nonlinear optimization model.

Restriction 1. The weight coefficients of criteria are proportional to their comparative significance within the observed criteria ${}^{w_k}/_{w_{k+1}} = \varphi_{k/(k+1)}$

Restriction 2. The weight coefficients must adhere to the principle of mathematical transitivity $\varphi_{k/(k+1)} \otimes \varphi_{(k+1)/(k+2)} = \varphi_{k/(k+2)}$

Step 4. Based on Eq. (1), defining a model to establish the ultimate values of the weight coefficients for evaluation criteria.

$$\begin{gathered} \left|\frac{w_{j(k)}}{w_{j(k+1)}} - \varphi_{k/(k+1)}\right| \leq \chi, \forall j \\ \left|\frac{w_{j(k)}}{w_{j(k+2)}} - \varphi_{k/(k+1)} \otimes \varphi_{(k+1)/(k+2)}\right| \leq \chi, \forall j \\ \sum_{j=1}^{n} w_j = 1 \\ w_j \geq 0, \forall j \end{gathered} \tag{1}$$

Step 5. Determining the final values of evaluation criteria $(w_1, w_2, \ldots\ldots\ldots\ldots\ldots\ldots, w_n)^T$

2.2. LOPCOW Method

LOgarithmic Percentage Change-driven Objective Weighting (LOPCOW) was developed by Ecer and Pamučar in 2022. It's one of the recent approaches used in objective weighting methods. The steps of the LOPCOW method are shown below:

Step 1. The decision matrix is formed.

Step 2. The decision matrix is normalized based on cost and benefit criterion using Eqs. (2)-(3), respectively.

$r_{ij} = \frac{x_{max} - x_{ij}}{x_{max} - x_{min}}$, if j is a cost criterion (2)

$r_{ij} = \frac{x_{ij} - x_{min}}{x_{max} - x_{min}}$, if j is a benefit criterion (3)

Step 3. Eq. (4) is used to calculate the percentage values (PV) of each criterion.

$$PV_{ij} = \left| \ln \left(\frac{\sqrt{\frac{\sum_{i=1}^{m} r_{ij}^2}{m}}}{\sigma} \right) . 100 \right| \tag{4}$$

Step 4. Based on Eq. (5), each objective weight of criteria is calculated.

$$w_j = \frac{PV_{ij}}{\sum_{i=1}^{n} PV_{ij}} \tag{5}$$

2.3. AWM

According to Eq. (6), the aggregated weight is determined (Ighravwe & Babatunde, 2018; Ali et al., 2020]);

$$W_{Aggregated} = \Delta W_{sj} + (1 - \Delta) W_{oj} \tag{6}$$

where W_{sj} and W_{oj} represent the subjective and objective weights of the criteria, respectively and Δ symbolizes the contribution factor. Keshavarz Ghorabaee et al. (2017) suggested using values of Δ from 0 to 1. For this study, $\Delta = 0.5$ was considered.

2.4. SPOTIS Method

Stable Preference Ordering Towards Ideal Solution (SPOTIS) method was proposed by Dezert, Tchamova, Han and Tacnet in 2020. It's one of the recent approaches used in ranking of alternatives based on ideal solution point, and it has a very low complexity. The steps of the SPOTIS method are shown below:

Step 1. Eq. (7) is used to normalize the distances to the ideal solution point

$$d\ (A_i S_j^* = \frac{\left|S_{ij} - S_j^*\right|}{\left|S_j^{max} - S_j^{min}\right|} \tag{7}$$

Step 2. According to Eq. (8), the weighted normalized distances are calculated.

$$d\left(A_i, S^*\right) = \sum_{j=1}^{N} w_j d_{ij}\left(A_i, S^*\right) \tag{8}$$

Step 3. The final ranking is determined through the values of $d\left(A_i, S^*\right)$. Smaller values of $d\left(A_i, S^*\right)$are desirable.

2.5. RSMVC Method

Ranking the Solutions based on the Mean Value of Criteria (RSMVC) method was proposed by Van Dua and Thinh in 2023. It's one of the recent approaches used in ranking of alternatives based on the mean value of the criteria. The steps of the RSMVC method are shown below:

Step 1. The decision matrix is formed.

Step 2. Eq. (9) is utilized to calculate the average values of the criteria.

$$\bar{x}_{ij} = \frac{a_{ij} - b_{ij}}{2} \tag{9}$$

Step 3. The ranking of each criterion is determined by its mean value.

For the benefit criterion, the solution with the highest average value is positioned first, while the one with the lowest average value is placed last.

For the cost criterion, the solution with the lowest average value is assigned the top rank, while the one with the highest average value is positioned at the bottom.

Step 4. Based on Eq. (10), the scores of the alternatives are computed.

$$S_i = r_{ij.} w_j \tag{10}$$

Step 5. The final ranking is obtained based on S_i score, the lowest one is the best solution.

2.6. CoCoSo Method

A Combined Compromise Solution (CoCoSo) method was developed by Yazdani, Zarate, Zavadskas and Turkis in 2019. This method is based on an integrated simple additive weighting and exponentially weighted product model. It's one of the most popular methods used in ranking of alternatives. The steps of the CoCoSo method are shown below:

Step 1. The decision matrix is formed.

Step 2. The decision matrix is normalized based on benefit and cost criterion via Eqs. (11)-(12), respectively.

$$r_{ij} = \frac{x_{ij} - \min\limits_i(x_{ij})}{\max\limits_i(x_{ij}) - \min\limits_i(x_{ij})}\text{; for benefit criterion} \tag{11}$$

$$r_{ij} = \frac{\max\limits_i(x_{ij}) - x_{ij}}{\max\limits_i(x_{ij}) - \min\limits_i(x_{ij})}\text{; for cost criterion} \tag{12}$$

Step 3. Eqs. (13) and (14) are utilized to calculate the weighted comparability sequence and (S_i), and exponentially weighted comparability sequence and (P_i) for each alternative, respectively.

$$S_i = \sum_{i=1}^{n} \left(w_j r_{ij}\right) \tag{13}$$

$$P_i = \sum_{i=1}^{n} \left(r_{ij}\right)^{w_j} \tag{14}$$

Step 4. Based on Eqs. (15)-(17), relative weights of the alternatives are calculated based on three appraisal score strategies. In Eq. (?), λ (usually $\lambda = 0.5$) is chosen by decision makers.

$$ʒ_{ia} = \frac{P_i + S_i}{\sum_{i=1}^{m}(P_i + S_i)'} \tag{15}$$

$$ʒ_{ib} = \frac{S_i}{\min\limits_i(S_i)} + \frac{P_i}{\min\limits_i(P_i)'} \tag{16}$$

$$ʒ_{ic} = \frac{\lambda S_i + (1-\lambda)P_i}{\lambda \max\limits_i(S_i) - (1-\lambda)\max\limits_i(P_i)} \; ; 0 \le \lambda \le 1 \tag{17}$$

Step 5. The final ranking is determined based on k_i values (Eq.18) (as more significant as better):

$$ʒ_i = (ʒ_{ia} ʒ_{ib} ʒ_{ic})^{\frac{1}{3}} + \frac{1}{3}(ʒ_{ia} + ʒ_{ib} + ʒ_{ic}) \tag{18}$$

2.7. Borda Count Method

The Borda count method was proposed by Jean Charles de Borda in 1784. It's a method that designed to prioritize alternatives based on the cumulative preferences of decision-makers. The Borda method allocates points to each alternative based on their rankings within the relevant group or class. Each decision criterion in the set awards $N_A - 1$ point to the top-ranked option, $N_A - 2$ points to the second-ranked option, decreasing to zero points for the least favored option (Aydin & Gümüş, 2022). The Borda score for each alternative are calculated as follows (Topçu et al., 2019):

$$B_i = \sum_{k=1}^{N_A} (N_A - r_{ik}) \tag{19}$$

3. RESULTS AND DISCUSSION

In this section, the results of the proposed model are presented. The proposed model was applied based on ten criteria to select the best market alternatives for exporting companies in iron and steel sector. This sector was selected due to the its importance of the Turkish exports. Ergün (2023) emphasized that Türkiye is one of the leading countries in the world, in terms of iron and steel production and exports. Additionally, the iron and steel sector are considered as one of the main sectors in the development of Turkish exports. In this regards, twenty-three potential markets were selected to determine the best alternatives for the iron and steel exporter companies. The potential markets were selected based on the target market for export list which is published by Republic of Türkiye Ministry of Trade in 2023. According to aforementioned list, more than fifty countries were selected as a target market for Turkish exporter companies. However, in this study, a total of twenty-three potential markets were evaluated due to the lack of data. These markets are as follows: Brazil, Canada, Colombia, Czechia, France, Germany, Indonesia, Israel, Italy, Japan, Malaysia, Mexico, Peru, Philippines, Qatar, Saudi Arabia, South Africa, South Korea, Spain, UAE, UK, USA and Venezuela. Once the alternatives (potential markets) were selected, the criteria were determined based on literature review (Mobin et al., 2014; Yavuz, 2016; Cano et al., 2017; Ünal & İpekçi Çetin, 2019; Vanegas-López et al., 2021; Baena-Rojas et al., 2023) and expert opinions. Table 2 illustrates the overview of the criteria used in this study.

Table 2. Description of Criteria

Criteria	Abbr.	Definitions	Sources
Population	C_1	Counts all residents regardless of legal status or citizenship.	

GDP	C_2	Counts all of the output generated within the borders of a country.	World Bank
LPI	C_3	Measures the logistics performance of nations.	
Doing Business	C_4	Benchmarks aspects of business regulation and practice	
Market Size	C_5	The total number of sales from the exporting country.	
Tariff	C_6	The tariff rates applied by the importing country	Trademap
Balance of Trade	C_7	The difference between the value of the exports and the one of the imports.	
Corruption Index	C_8	Measures the perceived levels of public sector corruption.	Transparency International
Global Competitiveness Index	C_9	Analyzes countries according to how they manage their competencies to achieve long-term value creation	IMD
Distance	C_{10}	Measures the geographical distance between countries	Distance from to

For this investigation, ten criteria were used to select the best market alternatives for iron and steel exporter companies. These criteria are as follows: Population (thousands), GDP (current US$), LPI (1: worst, 5: best), Doing Business (the average of 10 topics was taken and the lowest value is the best.), Market Size (thousands of US$), Tariff (%), Balance of Trade (thousands of US$), Corruption Index (0: worst, 100: best), Global Competitiveness Index (0: worst, 100: best) and Distance (km). The data was obtained from the "World Bank, Trademap, Transparency International, IMD and Distance from to" websites. Additionally, the Harmonized System (HS) code of 72 (Iron and steel) and 73 (Articles of iron or steel) was used to construct the decision matrix. The decision matrix created based on data obtained from various databases is shown in Table 3.

Table 3. Decision Matrix

Country	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9	C_{10}
Germany	83,797.99	4,082,469.49	4,10	45	726,456	0	-118,235	78	80,47	2,359
USA	333,287.56	25,439,700.00	3,8	30,5	706,5745	0,8	-365,071	69	91,14	10,205
UAE	9,441.13	507,063.97	4	30,3	76,5425	5,45	72,5615	68	90,52	2,463
UK	66,971.40	3,089,072.72	3,7	24,2	566,358	0	-68,5905	71	75,48	3,389
Brazil	215,313.50	1,920,095.78	3,2	113,1	67,439	12,8	-155,17	36	42,09	10,753
Czechia	10.672,12	290,527.55	3,3	61,6	49,7065	0	1,305	57	83,48	1,974
Indonesia	275,501.34	1,319,100.22	3	84,8	8,1675	9,65	-315,788	34	70,75	9,089
France	67,971.31	2,779,092.24	3,9	45,8	224,844	0	-341,021	71	71,05	2,805
Philippines	115,559.01	404,284.33	3,3	103,7	5,3045	4,65	5,174	34	54,14	8,862
South Africa	59,893.89	405,270.85	3,7	92,1	17,2775	8,65	-2,359	41	40,19	7,802
South Korea	51,628.12	1,673,916.47	3,8	24,9	23,963	0	-745,315	63	75,71	7,808
Italy	58,940.43	2,049,737.17	3,7	70,1	690,0615	0	118,8775	56	63,32	1,946
Spain	47,778.34	1,417,800.47	3,9	47,8	357,1255	0	43,878	60	67,22	3,318
Japan	125,124.99	4,232,173.92	3,9	49,3	33,504	0,1	-285,004	73	67,84	8,547
Canada	38,929.90	2,137,939.22	4	43,2	300,469	0,55	199,021	76	88,21	8,862
Qatar	2,695.12	236,258.30	3,5	78,9	43,1585	5	42,7805	58	89,72	2,124
Colombia	51,874.02	343,622.11	2,9	84,2	51,7045	3,75	50,152	40	46,26	11,360
Malaysia	33,938.22	407,027.45	3,6	40,8	19,8385	10,8	-16,6155	50	75,75	7,714
Mexico	127,504.13	1,465,854.09	2,9	74,8	85,13	0,95	71,0395	31	47,68	11,806
Peru	34,049.59	242,631.57	3	81,9	117,2545	0,75	117,2545	33	48,1	12,400
Saudi Arabia	36,408.82	1,108,571.52	3,4	54,8	30,1715	5	-34,303	52	86,06	1,913
Venezuela	28,301.70	482,359.32	2,3	167,8	2,7205	13	-295,209	13	26,18	10,58
Israel	9,557.50	525,002.45	3,6	48,1	785,068	0	683,2375	62	78,84	879

In this study, the weights of the criteria were determined by two different approaches, namely FUCOM (subjective) and LOPCOW (objective). After the weights of criteria was calculated by two different approaches, the weights were combined with the AWM method.

3.1. The results obtained from the FUCOM method

The FUCOM method was applied to determine the weight of the criteria based on arithmetic mean of four expert's opinions. Expert groups consist of the export manager, market research specialists and academician. Expert opinions were taken according to 1-9 (1: equally important, 9: extremely more important than…) ratio scale. In the first step of the FUCOM method, the criteria were ranked by experts, and the comparative priorities were determined based on expert's preferences. Then, two conditions were met to obtain the final values of the weight coefficients. The final values of the weight coefficients (0,0560, 0,1367, 0,0588, 0,0936, 0,1243, 0,1651, 0,0663, 0,0778, 0,0503, 0,1712) and DFC of the results $_X$ = 0.000 were obtained using Eq. (1). The results of the FUCOM method are presented in Table 4.

Table 4. Results of the FUCOM method

Criteria	DM_1	DM_2	DM_3	DM_4	*Overall*	*Rank*
C_1	0,0445	0,0512	0,0526	0,0758	0,0560	9
C_2	0,1039	0,1279	0,0877	0,2273	0,1367	3
C_3	0,0519	0,0853	0,0526	0,0455	0,0588	8
C_4	0,0779	0,0512	0,1316	0,1136	0,0936	5
C_5	0,0779	0,2558	0,0877	0,0758	0,1243	4
C_6	0,1558	0,1279	0,2632	0,1136	0,1651	2
C_7	0,0623	0,0365	0,0526	0,1136	0,0663	7
C_8	0,0623	0,0853	0,0877	0,0758	0,0778	6
C_9	0,0519	0,0512	0,0526	0,0455	0,0503	10
C_{10}	0,3116	0,1279	0,1316	0,1136	0,1712	1

The FUCOM results showed that distance (C_{10}) was the most important criteria, followed by tariff (C_6) and GDP (C_2). On the other hand, global competitiveness index (C_9) was the least important criteria, followed by population (C_1) and LPI (C_3). Afterwards, the weights of the criteria were calculated by the LOPCOW method.

3.2. The results obtained from the LOPCOW method

According to Eqs. (2-3), the decision matrix was normalized based on the benefit or cost criterion. Eq. (4) was used to determine the percentage values (*PV*) of each criterion. The final values of the weight coefficients were obtained using the Eq. (5), and the results of the LOPCOW method is illustrated in Table 5.

Table 5. Results of the LOPCOW method

Country	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9	C_{10}
	max	max	max	min	max	min	min	max	max	min
Germany	0,2453	0,1526	1,0000	0,1448	0,0998	1,0000	0,9172	1,0000	0,8357	0,8646
USA	1,0000	1,0000	0,8333	0,0439	1,0000	0,9385	0,9498	0,8615	1,0000	0,1465
UAE	0,0204	0,0107	0,9444	0,0425	0,1053	0,5808	0,8059	0,8462	0,9905	0,8550
UK	0,1944	0,1132	0,7778	0,0000	0,0770	1,0000	0,9922	0,8923	0,7589	0,7703
Brazil	0,6431	0,0668	0,5000	0,6191	0,0062	0,0154	***	0,3538	0,2449	0,0964
Czechia	0,0241	0,0022	0,5556	0,2604	0,0672	1,0000	0,9015	0,6769	0,8821	0,8998
Indonesia	0,8252	0,0430	0,3889	0,4220	0,0082	0,2577	0,9433	0,3231	0,6861	0,2487
France	0,1975	0,1009	0,8889	0,1504	0,0285	1,0000	0,9466	0,8923	0,6907	0,8237
Philippines	0,3414	0,0067	0,5556	0,5536	0,0041	0,6423	0,9010	0,3231	0,4304	0,2694
South Africa	0,1730	0,0067	0,7778	0,4728	0,0211	0,3346	0,9020	0,4308	0,2157	0,3664

South Korea	0,1480	0,0570	0,8333	0,0049	0,0000	1,0000	1,0000	0,7692	0,7625	0,3659
Italy	0,1701	0,0720	0,7778	0,3196	0,9765	1,0000	0,7448	0,6615	0,5717	0,9024
Spain	0,1364	0,0469	0,8889	0,1643	0,5037	1,0000	0,8959	0,7231	0,6318	0,7768
Japan	0,3703	0,1585	0,8889	0,1748	0,0014	0,9923	0,9393	0,9231	0,6413	0,2983
Canada	0,1096	0,0755	0,9444	0,1323	0,0393	0,9577	0,8754	0,9692	0,9549	0,2694
Qatar	0,0000	0,0000	0,6667	0,3809	0,0579	0,6154	0,8452	0,6923	0,9781	0,8861
Colombia	0,1488	0,0043	0,3333	0,4178	0,0700	0,7115	0,8950	0,4154	0,3091	0,0408
Malaysia	0,0945	0,0068	0,7222	0,1156	0,0248	0,1692	0,9236	0,5692	0,7631	0,3745
Mexico	0,3775	0,0488	0,3333	0,3524	***	0,9269	0,8079	0,2769	0,3310	0,0000
Peru	0,0948	0,0003	0,3889	0,4018	0,1631	0,9423	0,7469	0,3077	0,3374	-0,0544
Saudi Arabia	0,1020	0,0346	0,6111	0,2131	0,0394	0,6154	0,9062	0,6000	0,9218	0,9054
Venezuela	0,0775	0,0098	0,0000	1,0000	0,0005	0,0000	0,9406	0,0000	0,0000	0,1122
Israel	0,0208	0,0115	0,7222	0,1664	0,1081	1,0000	0,0000	0,7538	0,8107	1,0000
Mean sq.	0,2398	0,0882	0,6667	0,2849	0,1546	0,7261	0,8536	0,6201	0,6412	0,4877
Std. dev.	0,2589	0,2044	0,2513	0,2343	0,2850	0,3454	0,2661	0,2701	0,2869	0,3608
PV	-7,679	-84,055	97,580	19,547	-61,148	74,293	116,577	83,120	80,416	30,157
w	-0,0220	-0,2410	0,2798	0,0560	-0,1753	0,2130	0,3342	0,2383	0,2305	0,0865
Rank	8	10	2	7	9	5	1	3	4	6

The LOPCOW results showed that balance of trade (C_7) was the most important criteria, followed by LPI (C_3) and corruption index (C_8). On the other hand, GDP (C_2) was the least important criteria, followed by market size (C_5) and population (C_1). It can be seen above (Table 4-5); two different rankings were obtained from two methods. Surprisingly, significant differences were found in the most and least important criteria. For instance, GDP and LPI were the most and least important criteria in the FUCOM method, while LPI and GDP were the most and least important criteria in the LOPCOW method. For this reason, the AWM was used to combine the results obtained by two methods. The weights were combined using the Eq. (6), and its results are shown in Table 6.

Table 6. Results of the AWM

Criteria	FUCOM	LOPCOW	AWM	rank
C_1	0,0560	-0,0220	0,0170	8
C_2	0,1367	-0,2410	-0,0521	10
C_3	0,0588	0,2798	0,1693	3
C_4	0,0935	0,0560	0,0748	7
C_5	0,1243	-0,1753	-0,0255	9
C_6	0,1651	0,2130	0,1891	2
C_7	0,0662	0,3342	0,2002	1
C_8	0,0777	0,2383	0,1580	4
C_9	0,0503	0,2305	0,1404	5
C_{10}	0,1711	0,0865	0,1288	6
Sum	1,000	1,000	1,000	

The AWM results showed that balance of trade (C_7), tariff (C_6) and LPI (C_3) were the most important criteria, while GDP (C_2), market size (C_5) and population (C_1) were the least important criteria, respectively. Once the weights of the criteria were calculated, the best market alternatives were determined by SPOTIS, RSMVC, CoCoSo and Borda count methods.

3.3. The results obtained from the SPOTIS method

Based on Eq. (7), the decision matrix was normalized and its results are shown in Table 7. Once the normalized distances were determined, the normalized weighted average distances were computed by Eq. (8), and the results of the SPOTIS method are presented in Table 8.

Table 7. Normalized Decision Matrix (SPOTIS)

Country	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9	C_{10}
Germany	0,7547	0,8474	0,0000	0,8552	0,9002	1,0000	0,9172	0,0000	0,1643	0,8646
USA	0,0000	0,0000	0,1667	0,9561	0,0000	0,9385	0,9498	0,1385	0,0000	0,1465
UAE	0,9796	0,9893	0,0556	0,9575	0,8947	0,5808	0,8059	0,1538	0,0095	0,8550
UK	0,8056	0,8868	0,2222	1,0000	0,9230	1,0000	0,9922	0,1077	0,2411	0,7703
Brazil	0,3569	0,9332	0,5000	0,3809	0,9938	0,0154	***	0,6462	0,7551	0,0964
Czechia	0,9759	0,9978	0,4444	0,7396	0,9328	1,0000	0,9015	0,3231	0,1179	0,8998
Indonesia	0,1748	0,9570	0,6111	0,5780	0,9918	0,2577	0,9433	0,6769	0,3139	0,2487
France	0,8025	0,8991	0,1111	0,8496	0,9715	1,0000	0,9466	0,1077	0,3093	0,8237
Philippines	0,6586	0,9933	0,4444	0,4464	0,9959	0,6423	0,9010	0,6769	0,5696	0,2694
South Africa	0,8270	0,9933	0,2222	0,5272	0,9789	0,3346	0,9020	0,5692	0,7843	0,3664
South Korea	0,8520	0,9430	0,1667	0,9951	1,0000	1,0000	1,0000	0,2308	0,2375	0,3659
Italy	0,8299	0,9280	0,2222	0,6804	0,0235	1,0000	0,7448	0,3385	0,4283	0,9024
Spain	0,8636	0,9531	0,1111	0,8357	0,4963	1,0000	0,8959	0,2769	0,3682	0,7768
Japan	0,6297	0,8415	0,1111	0,8252	0,9986	0,9923	0,9393	0,0769	0,3587	0,2983
Canada	0,8904	0,9245	0,0556	0,8677	0,9607	0,9577	0,8754	0,0308	0,0451	0,2694
Qatar	1,0000	1,0000	0,3333	0,6191	0,9421	0,6154	0,8452	0,3077	0,0219	0,8861
Colombia	0,8512	0,9957	0,6667	0,5822	0,9300	0,7115	0,8950	0,5846	0,6909	0,0408
Malaysia	0,9055	0,9932	0,2778	0,8844	0,9752	0,1692	0,9236	0,4308	0,2369	0,3745
Mexico	0,6225	0,9512	0,6667	0,6476	***	0,9269	0,8079	0,7231	0,6690	0,0000
Peru	0,9052	0,9997	0,6111	0,5982	0,8369	0,9423	0,7469	0,6923	0,6626	0,0544
Saudi Arabia	0,8980	0,9654	0,3889	0,7869	0,9606	0,6154	0,9062	0,4000	0,0782	0,9054
Venezuela	0,9225	0,9902	1,0000	0,0000	0,9995	0,0000	0,9406	1,0000	1,0000	0,1122
Israel	0,9792	0,9885	0,2778	0,8336	0,8919	1,0000	0,0000	0,2462	0,1893	1,0000

Table 8. Results of the SPOTIS method

Country	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9	C_{10}	Σ	Rank
Germany	0,0128	-0,0442	0,0000	0,0640	-0,0230	0,1891	0,1837	0,0000	0,0231	0,1114	0,5168	11
USA	0,0000	0,0000	0,0282	0,0715	0,0000	0,1774	0,1902	0,0219	0,0000	0,0189	0,5081	10
UAE	0,0167	-0,0516	0,0094	0,0716	-0,0228	0,1098	0,1614	0,0243	0,0013	0,1101	0,4303	4
UK	0,0137	-0,0462	0,0376	0,0748	-0,0235	0,1891	0,1987	0,0170	0,0339	0,0992	0,5942	16
Brazil	0,0061	-0,0487	0,0846	0,0285	-0,0253	0,0029	***	0,1021	0,1060	0,0124	0,2687	1
Czechia	0,0166	-0,0520	0,0752	0,0553	-0,0238	0,1891	0,1805	0,0511	0,0166	0,1159	0,6244	21
Indonesia	0,0030	-0,0499	0,1035	0,0432	-0,0253	0,0487	0,1889	0,1070	0,0441	0,0320	0,4952	7
France	0,0136	-0,0469	0,0188	0,0636	-0,0248	0,1891	0,1896	0,0170	0,0434	0,1061	0,5695	15
Philippines	0,0112	-0,0518	0,0752	0,0334	-0,0254	0,1214	0,1804	0,1070	0,0800	0,0347	0,5661	14
South Africa	0,0141	-0,0518	0,0376	0,0394	-0,0250	0,0633	0,1806	0,0900	0,1101	0,0472	0,5055	9
South Korea	0,0145	-0,0492	0,0282	0,0744	-0,0255	0,1891	0,2002	0,0365	0,0334	0,0471	0,5487	12
Italy	0,0141	-0,0484	0,0376	0,0509	-0,0006	0,1891	0,1491	0,0535	0,0601	0,1162	0,6217	20
Spain	0,0147	-0,0497	0,0188	0,0625	-0,0127	0,1891	0,1794	0,0438	0,0517	0,1001	0,5976	17

Japan	0,0107	-0,0439	0,0188	0,0617	-0,0255	0,1876	0,1881	0,0122	0,0504	0,0384	0,4985	8
Canada	0,0151	-0,0482	0,0094	0,0649	-0,0245	0,1811	0,1753	0,0049	0,0063	0,0347	0,4190	3
Qatar	0,0170	-0,0521	0,0564	0,0463	-0,0240	0,1163	0,1692	0,0486	0,0031	0,1141	0,4950	6
Colombia	0,0145	-0,0519	0,1129	0,0436	-0,0237	0,1345	0,1792	0,0924	0,0970	0,0053	0,6037	18
Malaysia	0,0154	-0,0518	0,0470	0,0662	-0,0249	0,0320	0,1849	0,0681	0,0333	0,0482	0,4184	2
Mexico	0,0106	-0,0496	0,1129	0,0484	***	0,1752	0,1618	0,1143	0,0939	0,0000	0,6675	23
Peru	0,0154	-0,0521	0,1035	0,0447	-0,0213	0,1782	0,1496	0,1094	0,0930	0,0070	0,6273	22
Saudi Arabia	0,0153	-0,0503	0,0658	0,0589	-0,0245	0,1163	0,1814	0,0632	0,0110	0,1166	0,5538	13
Venezuela	0,0157	-0,0516	0,1693	0,0000	-0,0255	0,0000	0,1883	0,1580	0,1404	0,0145	0,6091	19
Israel	0,0167	-0,0515	0,0470	0,0624	-0,0227	0,1891	0,0000	0,0389	0,0266	0,1288	0,4351	5

The SPOTIS results showed that Brazil, Malaysia, Canada, the UAE, Israel, Qatar, Indonesia, Japan, South Africa and the USA were the best market alternatives for iron and steel exporter companies. Conversely, Mexico, Peru, Czechia, Italy, Venezuela, Colombia, Spain, the UK, France and Philippines were the worst market alternatives for iron and steel exporter companies.

3.4. The results obtained from the RSMVC method

According to Eq. (9), the mean value of each criterion was calculated and it's shown in Table 9. Afterwards, the criteria were ranked based on the mean value and the solution for each criterion is shown in Table 10. Eq. (10) was used to calculate the score of each criterion (S_i) and the best solution is the one with the smallest S_i score. Table 11 presents the results of the RSMVC method.

Table 9. The average of the criteria

Country	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9	C_{10}
Germany	41899	2041235	2,05	22,5	363228	0	-59117,5	39	40,235	1179,5
USA	166643,8	12719850	1,9	15,25	3532873	0,4	-182536	34,5	45,57	5102,5
UAE	4720,565	253532	2	15,15	382712,5	2,725	362807,5	34	45,26	1231,5
UK	33485,7	1544536	1,85	12,1	283179	0	-342953	35,5	37,74	1694,5
Brazil	107656,8	960047,9	1,6	56,55	33719,5	6,4	-77585	18	21,045	5376,5
Czechia	5336,06	145263,8	1,65	30,8	248532,5	0	652,5	28,5	41,74	987
Indonesia	137750,7	659550,1	1,5	42,4	40837,5	4,825	-157894	17	35,375	4544,5
France	33985,66	1389546	1,95	22,9	112422	0	-170511	35,5	35,525	1402,5
Philippines	57779,51	202142,2	1,65	51,85	26522,5	2,325	2587	17	27,07	4431
South Africa	29946,95	202635,4	1,85	46,05	86387,5	4,325	-1179,5	20,5	20,095	3901
South Korea	25814,06	836958,2	1,9	12,45	11981,5	0	-372658	31,5	37,855	3904
Italy	29470,22	1024869	1,85	35,05	3450308	0	594387,5	28	31,66	973
Spain	23889,17	708900,2	1,95	23,9	1785628	0	21939	30	33,61	1659
Japan	62562,5	2116087	1,95	24,65	16752	0,05	-142502	36,5	33,92	4273,5
Canada	19464,95	1068970	2	21,6	150234,5	0,275	99510,5	38	44,105	4431
Qatar	1347,56	118129,2	1,75	39,45	215792,5	2,5	213902,5	29	44,86	1062
Colombia	25937,01	171811,1	1,45	42,1	258522,5	1,875	25076	20	23,13	5680
Malaysia	16969,11	203513,7	1,8	20,4	99192,5	5,4	-83077,5	25	37,875	3857
Mexico	63752,07	732927	1,45	37,4	42,565	0,475	355197,5	15,5	23,84	5903
Peru	17024,8	121315,8	1,5	40,95	586272,5	0,375	586272,5	16,5	24,05	6200
Saudi Arabia	18204,41	554285,8	1,7	27,4	150857,5	2,5	-17151,5	26	43,03	956,5
Venezuela	14150,85	241179,7	1,15	83,9	13602,5	6,5	-147605	6,5	13,09	5290
Israel	4778,75	262501,2	1,8	24,05	392534	0	3416188	31	39,42	439,5

Table 10. Ranking the solution for each criterion

Country	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9	C_{10}
Germany	7	3	1	17	7	16	14	1	7	18
USA	1	1	7	20	1	12	21	6	1	6
UAE	22	15	2	21	6	6	4	7	2	17
UK	9	4	9	23	8	16	22	4	11	14
Brazil	3	8	18	2	18	2	15	18	21	4
Czechia	20	21	16	11	10	16	11	12	6	20
Indonesia	2	12	19	5	17	4	19	19	13	7
France	8	5	4	16	14	16	20	4	12	16
Philippines	6	19	16	3	19	9	10	19	17	8
South Africa	10	18	9	4	16	5	12	16	22	12
South Korea	13	9	7	22	22	16	23	8	10	11
Italy	11	7	9	10	2	16	2	13	16	21
Spain	14	11	4	15	3	16	9	10	15	15
Japan	5	2	4	13	20	15	17	3	14	10
Canada	15	6	2	18	13	14	7	2	4	8
Qatar	23	23	14	8	11	7	6	11	3	19
Colombia	12	20	21	6	9	10	8	17	20	3
Malaysia	18	17	12	19	15	3	16	15	9	13
Mexico	4	10	21	9	23	11	5	22	19	2
Peru	17	22	19	7	4	13	3	21	18	1
Saudi Arabia	16	13	15	12	12	7	13	14	5	22
Venezuela	19	16	23	1	21	1	18	23	23	5
Israel	21	14	12	14	5	16	1	9	8	23

Table 11. Results of the RSMVC method

Country	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9	C_{10}	S_i	Rank
Germany	0,1190	-0,1564	0,1693	1,2717	-0,1785	3,0249	2,8033	0,1580	0,9830	2,3187	10,5130	4
USA	0,0170	-0,0521	1,1850	1,4961	-0,0255	2,2687	4,2049	0,9482	0,1404	0,7729	10,9557	5
UAE	0,3741	-0,7821	0,3386	1,5709	-0,1530	1,1343	0,8009	1,1063	0,2808	2,1899	6,8608	1
UK	0,1530	-0,2086	1,5236	1,7206	-0,2040	3,0249	4,4051	0,6321	1,5446	1,8034	14,3949	23
Brazil	0,0510	-0,4171	3,0472	0,1496	-0,4590	0,3781	3,0035	2,8446	2,9489	0,5153	12,0621	13
Czechia	0,3401	-1,0949	2,7086	0,8229	-0,2550	3,0249	2,2026	1,8964	0,8425	2,5763	13,0644	20
Indonesia	0,0340	-0,6257	3,2165	0,3740	-0,4335	0,7562	3,8044	3,0027	1,8255	0,9017	12,8559	19
France	0,1360	-0,2607	0,6772	1,1969	-0,3570	3,0249	4,0047	0,6321	1,6851	2,0611	12,8002	18
Philippines	0,1020	-0,9906	2,7086	0,2244	-0,4845	1,7015	2,0023	3,0027	2,3872	1,0305	11,6841	10
South Africa	0,1700	-0,9385	1,5236	0,2992	-0,4080	0,9453	2,4028	2,5286	3,0893	1,5458	11,1581	7
South Korea	0,2211	-0,4693	1,1850	1,6457	-0,5610	3,0249	4,6054	1,2643	1,4042	1,4170	13,7373	21
Italy	0,1871	-0,3650	1,5236	0,7481	-0,0510	3,0249	0,4005	2,0545	2,2468	2,7051	12,4745	16
Spain	0,2381	-0,5735	0,6772	1,1221	-0,0765	3,0249	1,8021	1,5804	2,1063	1,9322	11,8332	12
Japan	0,0850	-0,1043	0,6772	0,9725	-0,5100	2,8359	3,4040	0,4741	1,9659	1,2882	11,0884	6
Canada	0,2551	-0,3128	0,3386	1,3465	-0,3315	2,6468	1,4016	0,3161	0,5617	1,0305	7,2525	2
Qatar	0,3911	-1,1992	2,3701	0,5985	-0,2805	1,3234	1,2014	1,7384	0,4213	2,4475	9,0119	3
Colombia	0,2041	-1,0428	3,5551	0,4488	-0,2295	1,8906	1,6019	2,6866	2,8084	0,3864	12,3096	14
Malaysia	0,3061	-0,8864	2,0315	1,4213	-0,3825	0,5672	3,2037	2,3705	1,2638	1,6746	11,5698	9

Mexico	0,0680	-0,5214	3,5551	0,6733	-0,5865	2,0796	1,0012	3,4768	2,6680	0,2576	12,6717	17
Peru	0,2891	-1,1471	3,2165	0,5236	-0,1020	2,4578	0,6007	3,3188	2,5276	0,1288	11,8138	11
Saudi Arabia	0,2721	-0,6778	2,5393	0,8977	-0,3060	1,3234	2,6030	2,2125	0,7021	2,8340	12,4003	15
Venezuela	0,3231	-0,8342	3,8937	0,0748	-0,5355	0,1891	3,6042	3,6348	3,2297	0,6441	14,2237	22
Israel	0,3571	-0,7299	2,0315	1,0473	-0,1275	3,0249	0,2002	1,4223	1,1234	2,9628	11,3120	8

The RSMVC results showed that the UAE, Canada, Qatar, Germany, the USA, Japan, South Africa, Israel, Malaysia and Philippines were the best market alternatives for iron and steel exporter companies. Conversely, the UK, Venezuela, South Korea, Czechia, Indonesia, France, Mexico, Italy, Saudi Arabia and Colombia were the worst market alternatives for iron and steel exporter companies.

3.5. The results obtained from the CoCoSo method

At first, the decision matrix was normalized based on benefit or cost criterion using Eqs .(11-12), and its results are shown in Table 12. Then, the total of the weighted comparability sequence (S_i) and the whole of the power weight of comparability sequences (P_i) for each alternative were computed based on Eqs. (13-14), respectively. Table 13 shows the results of the S_i and P_i values. According to Eqs. (15-17), three appraisal score (k_{ia}, k_{ib} k_{ic}) were computed to generate relative weights (k_i) of other options. In this study, λ value was taken as 0.5. The final ranking was obtained based on Eq. (18), and its results are shown in Table 14.

Table 12. Normalized Decision Matrix (CoCoSo)

Country	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9	C_{10}
Germany	0,2453	0,1526	1,0000	0,1448	0,0998	1,0000	0,9172	1,0000	0,8357	0,8646
USA	1,0000	1,0000	0,8333	0,0439	1,0000	0,9385	0,9498	0,8615	1,0000	0,1465
UAE	0,0204	0,0107	0,9444	0,0425	0,1053	0,5808	0,8059	0,8462	0,9905	0,8550
UK	0,1944	0,1132	0,7778	0,0000	0,0770	1,0000	0,9922	0,8923	0,7589	0,7703
Brazil	0,6431	0,0668	0,5000	0,6191	0,0062	0,0154	***	0,3538	0,2449	0,0964
Czechia	0,0241	0,0022	0,5556	0,2604	0,0672	1,0000	0,9015	0,6769	0,8821	0,8998
Indonesia	0,8252	0,0430	0,3889	0,4220	0,0082	0,2577	0,9433	0,3231	0,6861	0,2487
France	0,1975	0,1009	0,8889	0,1504	0,0285	1,0000	0,9466	0,8923	0,6907	0,8237
Philippines	0,3414	0,0067	0,5556	0,5536	0,0041	0,6423	0,9010	0,3231	0,4304	0,2694
South Africa	0,1730	0,0067	0,7778	0,4728	0,0211	0,3346	0,9020	0,4308	0,2157	0,3664
South Korea	0,1480	0,0570	0,8333	0,0049	0,0000	1,0000	1,0000	0,7692	0,7625	0,3659
Italy	0,1701	0,0720	0,7778	0,3196	0,9765	1,0000	0,7448	0,6615	0,5717	0,9024
Spain	0,1364	0,0469	0,8889	0,1643	0,5037	1,0000	0,8959	0,7231	0,6318	0,7768
Japan	0,3703	0,1585	0,8889	0,1748	0,0014	0,9923	0,9393	0,9231	0,6413	0,2983
Canada	0,1096	0,0755	0,9444	0,1323	0,0393	0,9577	0,8754	0,9692	0,9549	0,2694
Qatar	0,0000	0,0000	0,6667	0,3809	0,0579	0,6154	0,8452	0,6923	0,9781	0,8861
Colombia	0,1488	0,0043	0,3333	0,4178	0,0700	0,7115	0,8950	0,4154	0,3091	0,0408
Malaysia	0,0945	0,0068	0,7222	0,1156	0,0248	0,1692	0,9236	0,5692	0,7631	0,3745
Mexico	0,3775	0,0488	0,3333	0,3524	***	0,9269	0,8079	0,2769	0,3310	0,0000
Peru	0,0948	0,0003	0,3889	0,4018	0,1631	0,9423	0,7469	0,3077	0,3374	-0,0544
Saudi Arabia	0,1020	0,0346	0,6111	0,2131	0,0394	0,6154	0,9062	0,6000	0,9218	0,9054
Venezuela	0,0775	0,0098	0,0000	1,0000	0,0005	0,0000	0,9406	0,0000	0,0000	0,1122
Israel	0,0208	0,0115	0,7222	0,1664	0,1081	1,0000	0,0000	0,7538	0,8107	1,0000

Table 13. Weighted Normalized Decision Matrix, S_i and P_i

Country	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9	C_{10}	S_i	P_i
Germany	0,0042	-0,0080	0,1693	0,0108	-0,0025	0,1891	0,1837	0,1580	0,1174	0,1114	0,9333	9,9447

USA	0,0170	-0,0521	0,1411	0,0033	-0,0255	0,1774	0,1902	0,1362	0,1404	0,0189	0,7468	9,4964
UAE	0,0003	-0,0006	0,1599	0,0032	-0,0027	0,1098	0,1614	0,1337	0,1391	0,1101	0,8143	9,8543
UK	0,0033	-0,0059	0,1317	0,0000	-0,0020	0,1891	0,1987	0,1410	0,1066	0,0992	0,8616	9,0283
Brazil	0,0109	-0,0035	0,0846	0,0463	-0,0002	0,0029	***	0,0559	0,0344	0,0124	0,2439	8,0000
Czechia	0,0004	-0,0001	0,0940	0,0195	-0,0017	0,1891	0,1805	0,1070	0,1239	0,1159	0,8284	10,0855
Indonesia	0,0140	-0,0022	0,0658	0,0316	-0,0002	0,0487	0,1889	0,0511	0,0963	0,0320	0,5260	9,4782
France	0,0034	-0,0053	0,1505	0,0113	-0,0007	0,1891	0,1896	0,1410	0,0970	0,1061	0,8818	9,9388
Philippines	0,0058	-0,0003	0,0940	0,0414	-0,0001	0,1214	0,1804	0,0511	0,0604	0,0347	0,5889	9,7612
South Africa	0,0029	-0,0003	0,1317	0,0354	-0,0005	0,0633	0,1806	0,0681	0,0303	0,0472	0,5585	9,6289
South Korea	0,0025	-0,0030	0,1411	0,0004	0,0000	0,1891	0,2002	0,1216	0,1071	0,0471	0,8060	8,5707
Italy	0,0029	-0,0038	0,1317	0,0239	-0,0249	0,1891	0,1491	0,1045	0,0803	0,1162	0,7691	9,7854
Spain	0,0023	-0,0024	0,1505	0,0123	-0,0128	0,1891	0,1794	0,1143	0,0887	0,1001	0,8213	9,8450
Japan	0,0063	-0,0083	0,1505	0,0131	0,0000	0,1876	0,1881	0,1459	0,0901	0,0384	0,8116	9,8941
Canada	0,0019	-0,0039	0,1599	0,0099	-0,0010	0,1811	0,1753	0,1532	0,1341	0,0347	0,8450	9,8421
Qatar	0,0000	0,0000	0,1129	0,0285	-0,0015	0,1163	0,1692	0,1094	0,1374	0,1141	0,7864	7,7435
Colombia	0,0025	-0,0002	0,0564	0,0313	-0,0018	0,1345	0,1792	0,0656	0,0434	0,0053	0,5163	9,4310
Malaysia	0,0016	-0,0004	0,1223	0,0086	-0,0006	0,0320	0,1849	0,0900	0,1072	0,0482	0,5938	9,6120
Mexico	0,0064	-0,0025	0,0564	0,0264	***	0,1752	0,1618	0,0438	0,0465	0,0000	0,5139	7,5258
Peru	0,0016	0,0000	0,0658	0,0301	-0,0042	0,1782	0,1496	0,0486	0,0474	-0,0070	0,5100	8,9551
Saudi Arabia	0,0017	-0,0018	0,1035	0,0159	-0,0010	0,1163	0,1814	0,0948	0,1294	0,1166	0,7570	9,8415
Venezuela	0,0013	-0,0005	0,0000	0,0748	0,0000	0,0000	0,1883	0,0000	0,0000	0,0145	0,2784	6,1891
Israel	0,0004	-0,0006	0,1223	0,0125	-0,0028	0,1891	0,0000	0,1191	0,1138	0,1288	0,6826	9,0052
Sum											15,6749	211,4569
Max											0,9333	10,0855
Min											0,2439	6,1891

Table 14. Results of the CoCoSo method

Country	k_{ia}	*rank*	k_{ib}	*rank*	k_{ic}	*rank*	k_i	*rank*
Germany	0,0479	2	5,4335	1	16,1651	2	8,6177	1
USA	0,0451	11	4,5964	12	15,5915	13	7,8216	11
UAE	0,0470	6	4,9309	7	16,0087	6	8,2315	7
UK	0,0435	16	4,9917	5	15,1473	16	7,8249	10
Brazil	0,0363	21	2,2926	22	13,7366	20	5,7362	22
Czechia	0,0481	1	5,0263	4	16,2635	1	8,4220	3
Indonesia	0,0440	14	3,6883	18	15,4616	14	7,2352	17
France	0,0476	3	5,2216	2	16,1331	3	8,4719	2
Philippines	0,0456	10	3,9916	15	15,7962	10	7,5689	12
South Africa	0,0449	13	3,8459	17	15,6392	11	7,4092	14
South Korea	0,0413	19	4,6898	11	14,6292	19	7,3976	15
Italy	0,0465	9	4,7345	9	15,9123	9	8,0647	9
Spain	0,0470	7	4,9582	6	16,0022	7	8,2445	6
Japan	0,0471	4	4,9263	8	16,0500	4	8,2501	5
Canada	0,0471	5	5,0550	3	16,0110	5	8,3071	4
Qatar	0,0376	20	4,4754	13	13,7331	21	6,8514	20
Colombia	0,0438	15	3,6406	19	15,4061	15	7,1823	18
Malaysia	0,0449	12	3,9878	16	15,6388	12	7,4913	13
Mexico	0,0354	22	3,3232	21	13,3636	22	6,0980	21

Peru	0,0417	18	3,5382	20	14,8931	18	6,8897	19
Saudi Arabia	0,0467	8	4,6940	10	15,9663	8	8,0680	8
Venezuela	0,0285	23	2,1415	23	11,8135	23	4,9013	23
Israel	0,0427	17	4,2537	14	15,0330	17	7,3522	16

The CoCoSo results showed that Germany, France, Czechia, Canada, Japan, Spain, the UAE, Saudi Arabia, Italy and the UK were the best market alternatives for iron and steel exporter companies. Conversely, Venezuela, Brazil, Mexico, Qatar, Peru, Colombia, Indonesia, Israel, South Korea and South Africa were the worst market alternatives for iron and steel exporter companies. The results obtained from three different methods revealed that the best or worst market alternatives for iron and steel exporter companies vary partially depending on the method. Aydın & Gümüş (2022) stated that the Borda count method is used to evaluate the accuracy of methods and calculate the compromise solutions. Therefore, the results obtained by various methods were combined with the Borda method to obtain more optimal and accurate results.

3.6. The results obtained from the Borda Count method

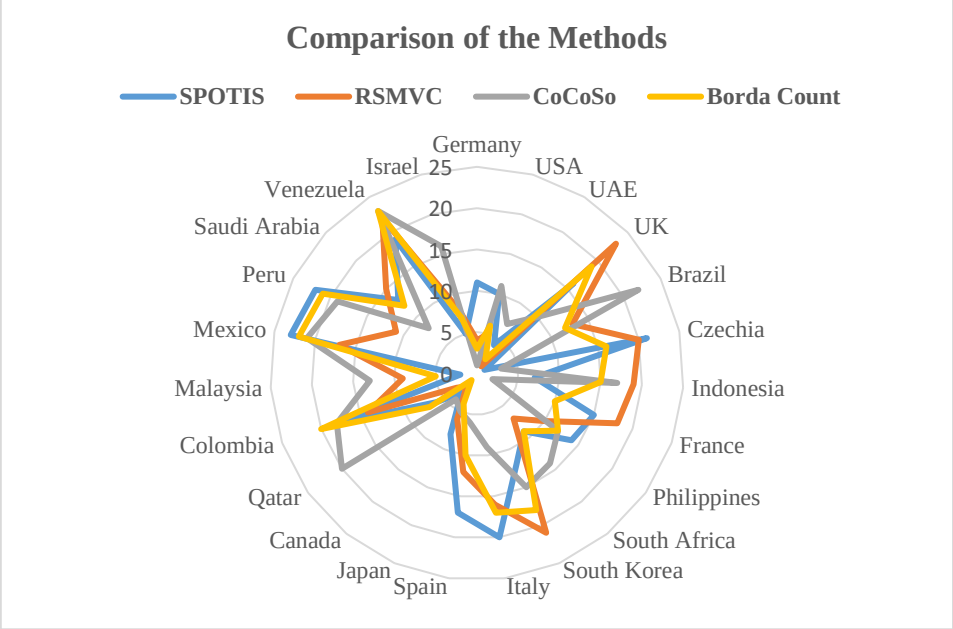
The Borda score of each alternative were calculated using Eq. (19), and the overall ranking obtained from the Borda method is shown in Table 15.

Table 15. Results of the Borda Count method

	SPOTIS		**RSMVC**		**CoCoSo**		**Borda Count**	
Country	**Rank**	**Score**	**Rank**	**Score**	**Rank**	**Score**	**Total Score**	**Rank**
Germany	11	12	4	19	1	22	53	3
USA	10	13	5	18	11	12	43	6
UAE	4	19	1	22	7	16	57	2
UK	16	7	23	0	10	13	20	19
Brazil	1	22	13	10	22	1	33	12
Czechia	21	2	20	3	3	20	25	16
Indonesia	7	16	19	4	17	6	26	15
France	15	8	18	5	2	21	34	10
Philippines	14	9	10	13	12	11	33	12
South Africa	9	14	7	16	14	9	39	9
South Korea	12	11	21	2	15	8	21	18
Italy	20	3	16	7	9	14	24	17
Spain	17	6	12	11	6	17	34	10
Japan	8	15	6	17	5	18	50	4
Canada	3	20	2	21	4	19	60	1
Qatar	6	17	3	20	20	3	40	7
Colombia	18	5	14	9	18	5	19	20
Malaysia	2	21	9	14	13	10	45	5
Mexico	23	0	17	6	21	2	8	22
Peru	22	1	11	12	19	4	17	21
Saudi Arabia	13	10	15	8	8	15	33	12
Venezuela	19	4	22	1	23	0	5	23
Israel	5	18	8	15	16	7	40	7

The Borda results showed that Canada, the UAE, Germany, Japan, Malaysia, the USA, Qatar, Israel, South Africa and France were the best market alternatives for iron and steel exporter companies. Conversely, Venezuela, Mexico, Peru, Colombia, the UK, South Korea, Italy, Czechia, Indonesia and Brazil were the worst market alternatives for iron and steel exporter companies. Figure 1 demonstrates the comparison for the methods.

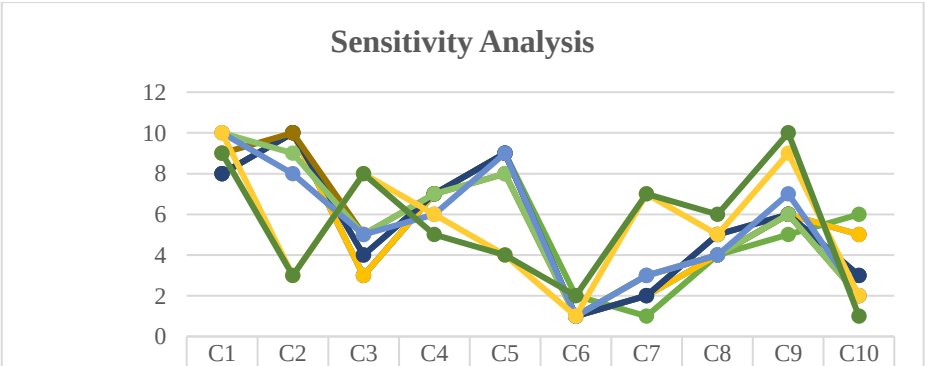
Figure 1. Ranking of alternatives based on different methods



3.7. Sensitivity Analysis

A significant number of studies have reported that sensitivity analysis is important in MCDM research to observe the impact of the criteria coefficients and methods on the results (Triantaphyllou & Sánchez, 1997; Maliene et al., 2018; Özekenci, 2023; Nabavi et al., 2023). Besides that, by conducting sensitivity analysis, decision-makers can attain the most reliable and accurate results (Demir et al., 2024). Accordingly, in this study, sensitivity analysis was carried out by modifying the λ values. As mentioned above, the λ value was taken as 0.5 for this study. However, it is important to monitor the impact of the change in λ value on the ranking. Figure 2 demonstrates the ranking of criteria based on different λ values.

Figure 2. Ranking of criteria based on different λ values



	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
ʎ=0.1	8	10	3	7	9	2	1	4	5	6
ʎ=0.2	8	10	3	7	9	1	2	4	6	5
ʎ=0.3	8	10	3	7	9	1	2	4	6	5
ʎ=0.4	8	10	4	7	9	1	2	5	6	3
ʎ=0.5	8	10	4	7	9	1	2	5	6	3
ʎ=0.6	9	10	5	7	8	1	3	4	6	2
ʎ=0.7	10	9	5	7	8	1	3	4	6	2
ʎ=0.8	10	8	5	6	9	1	3	4	7	2
ʎ=0.9	10	3	8	6	4	1	7	5	9	2
ʎ=1.00	9	3	8	5	4	2	7	6	10	1

It can be seen above, the ranking of the criteria is almost the same between the values of 0.1 and 0.8. However, there is a significant change on the ranking has been observed after the value of 0.8. Thus, it can be concluded that the results are more sensitive by certain values (more than 0.8). According to Demir & Arslan (2022) any change in the criteria weights can cause in some cases significantly change the order of the alternatives. The results obtained from the AWM confirmed that the weight coefficient is sensitive to changes in the λ value.

CONCLUSION

The iron and steel sector plays a crucial role for Türkiye's exporting industry due to its capacity to generate revenue, create jobs, drive industrial development, and contribute to global economic integration. Additionally, countries with competitive iron and steel sectors can utilize their exports to strengthen economic growth and developments (Konak & Kamacı, 2019). Thus, managers and decision makers of exporter companies focused on determining the optimal and most profitable target market(s) (Zolfani et al., 2021). However, selecting the right target market(s) poses significant challenges for many exporter companies due to its complexity, time-consuming, cost and risks. One of the best ways to minimize risks in international market for companies is to decrease the uncertainties. Therefore, a critical necessity involves gathering and analyzing adequate information and data concerning market conditions (Aytekin, et al., 2022). Correspondingly, this study attempt to find out the best market(s) alternatives for iron and steel exporter companies using the integrated MCDM methods. Within this scope, the proposed model was developed through three steps listed in Section fourth. At first, all criteria affecting the IMS were determined based on literature review. Afterwards, the criteria were evaluated on an objective and subjective scale by the help of experts. Finally, the SPOTIS, RSMVC, CoCoSo and Borda methods were applied to select the best suitable alternative(s).

According to results obtained from the FUCOM method, distance (C_{10}) and global competitiveness index (C_9) were the most and least important criteria, respectively. General ranking of the FUCOM method was determined as follows: $C_{10} > C_6 > C_2 > C_5 > C_4 > C_8 > C_7 > C_3 > C_1 > C_9$. Based on results obtained by the LOPCOW method, balance of trade (C_7) and GDP (C_2) were the most and least important criteria, respectively. General ranking of the LOPCOW method was determined as follows: $C_7 > C_3 > C_8 > C_9 > C_6 > C_{10} > C_4 > C_1 > C_5 > C_2$. Once the weight of criteria was calculated both methods, the results were combined with AWM. The AWM results showed that balance of trade (C_7) and GDP (C_2) were the most and least important criteria, respectively. Overall ranking of the criteria was as follows: $C_7 > C_6 > C_3 > C_8 > C_9 > C_{10} > C_4 > C_1 > C_5 > C_2$. The findings of the current study are consistent with those of Ünal & İpekçi Çetin (2019) who found that balance of trade and distance were the most important criteria, while the population and doing business were the least important criteria. However, the findings of the current study do not support the previous researches (Cano et al., 2017; Fidan, 2021; Baena-Rojas et al., 2023) which found that doing business, population and the LPI were the most important criteria. The findings obtained from the current and previous study revealed that the most or least important criteria vary by industry and the methods used.

In this study, several methods were applied to evaluate the most suitable target market(s) for exporter companies in iron and steel sector. The SPOTIS results showed that Brazil, Malaysia, Canada, the UAE and Israel were the best alternatives, while Mexico, Peru, Czechia, Italy and Venezuela were the worst alternatives for exporter companies. The RSMVC results the UAE, Canada, Qatar, Germany and the USA were the best alternatives, while the UK, Venezuela, South Korea, Czechia and Indonesia were the worst alternatives for exporter companies. The CoCoSo method showed that Germany, France, Czechia, Canada and Japan were the best alternatives, while Venezuela, Brazil, Mexico, Qatar and Peru were the worst alternatives for exporter companies. The ranking of target markets based on different methods showed that each method suggested different countries as a best and worst alternative. Therefore, the Borda method was applied to calculate the compromise solutions for each alternative. The Borda results showed that Canada, the UAE, Germany, Japan and Malaysia were the best alternatives, while Venezuela, Mexico, Peru, Colombia and the UK were the worst alternatives for exporter companies. As mentioned above, this is the first study to assess the international target market for exporter companies in iron and steel sector using the FUCOM and LOPCOW-based SPOTIS, RSMVC and CoCoSo methods. Nevertheless, the results of this study can be compared to the findings of previous study which was conducted for other sectors using the different methods. For instance, this result is in agreement with Cano's et al. (2017) findings which showed that Canada was the best market for exporter of frozen beef. Along with this, Ünal & İpekçi Çetin (2019) stated that Japan was one of the best markets for fertilizer's exporter companies.

To sum up, this study offers some important insights into managers or decision makers operated in iron and steel sector. Investors, exporters and policy makers in the private or public sector can analyze that which

criteria come to the fore in international market selection and which countries are more suitable for exporting based on the findings obtained from this study. However, several limitations to this study need to be acknowledged. The current study was only examined the countries which is selected by Republic of Türkiye Ministry of Trade as a target market for exporting. In future study, it might be possible to expand the number of countries. Although the criteria used in this study were conducted comprehensively, this study can be repeated through different criteria. Moreover, future studies on the current topic might be carried out with other MCDM methods, such as SWARA, LBWA, BWM, CRADIS, MACONT and etc.

REFERENCES

Aghdaie, M. H., & Alimardani, M. (2015). Target market selection based on market segment evaluation: a multiple attribute decision making approach. International Journal of Operational Research, 24(3), 262-278.

Aghdaie, M. H., Zolfani, S. H., & Zavadskas, E. K. (2013). Market segment evaluation and selection based on application of fuzzy AHP and COPRAS-G methods. Journal of Business Economics and Management, 14(1), 213-233.

Aghdaie, M. H., Zolfani, S. H., Rezaeinia, N., & Mehri-Tekmeh, J. (2011). A hybrid fuzzy MCDM approach for market segments evaluation and selection. In 2011 International Conference on Management and Service Science (pp. 1-4). IEEE.

Ali, T., Chiu, Y. R., Aghaloo, K., Nahian, A. J., & Ma, H. (2020). Prioritizing the existing power generation technologies in Bangladesh's clean energy scheme using a hybrid multi-criteria decision-making model. Journal of Cleaner Production, 267, 121901.

Aydin, F., & Gümüş, B. (2022). Comparative analysis of multi-criteria decision-making methods for the assessment of optimal SVC location. Bulletin of the Polish Academy of Sciences. Technical Sciences, 70(2).

Aytekin, A., Görçün, Ö. F., Ecer, F., Pamucar, D., & Karamaşa, Ç. (2023). Foreign market selection of suppliers through a novel REF-Sort technique. Kybernetes, 52(11), 4958-4992.

Baena-Rojas, J. J., Mackenzie-Torres, T. M., Cuesta-Giraldo, G., & Tabares, A. (2023). A hybrid multi-criteria decision-making technique for international market selection in SMEs. Polish Journal of Management Studies, 27.

Calik, A. (2020). Hedef pazar seçimi için hibrit BWM-ARAS karar verme modeli. Manisa Celal Bayar Üniversitesi Sosyal Bilimler Dergisi, 18(3), 196-210.

Cano, J., Campo, E., & Gómez-Montoya, R. (2017). International market selection using fuzzy weighing and Monte Carlo simulation. Polish Journal of Management Studies, 16(2), 40-50.

Demir, G., & Arslan, R. (2022). Sensitivity Analysis in Multi-Criterion Decision-Making Problems. Ankara Hacı Bayram Veli Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 24(3), 1025-1056.

Demir, G., Chatterjee, P., & Pamucar, D. (2024). Sensitivity analysis in multi-criteria decision making: A state-of-the-art research perspective using bibliometric analysis. Expert Systems with Applications, 237, 121660.

Dezert, J., Tchamova, A., Han, D., & Tacnet, J. M. (2020, July). The SPOTIS rank reversal free method for multi-criteria decision-making support. In 2020 IEEE 23rd International Conference on Information Fusion (FUSION) (pp. 1-8). IEEE.

Ecer, F., & Pamucar, D. (2022). A novel LOPCOW-DOBI multi-criteria sustainability performance assessment methodology: An application in developing country banking sector. Omega, 112, 102690.

Ergün, Ü. R. (2023). Türkiye'nin Politik Küreselleşmesinde Demir Çelik Sektörünün Rolü: Yapısal Kırılmalı Zaman Serisi Analizi. 19 Mayıs Sosyal Bilimler Dergisi, 4(4), 252-267.

Fidan, H. (2021). CRITIC ve MAIRCA çok kriterli karar verme yöntemi ile uluslararası hedef pazar seçimi. Karamanoğlu Mehmetbey Üniversitesi Sosyal ve Ekonomik Araştırmalar Dergisi, 23(41), 291-309.

Górecka, D., & Szałucka, M. (2013). Country market selection in international expansion using multicriteria decision aiding methods. Multiple criteria decision making, (8), 32-55.

Günay, F., & Toksöz, D. (2023, October). Multi-Criteria Decision Making in Determining an International Target Market in Tourism: The Case of Türkiye. In Proc. of the Balkan 9th International Conference on Social Sciences, Edirne, Türkiye.

Hashemkhani Zolfani, S., Ebadi Torkayesh, A., Ecer, F., Turskis, Z., & Šaparauskas, J. (2021). International market selection: a MABA based EDAS analysis framework. Oeconomia Copernicana, 12 (1), 99–124.

He, X., Lin, Z., & Wei, Y. (2016). International market selection and export performance: a transaction cost analysis. European Journal of Marketing, 50(5/6), 916-941.

Ighravwe, D., & Babatunde, M. (2018). Selection of a mini-grid business model for developing countries using CRITIC-TOPSIS with interval type-2 fuzzy sets. Decision Science Letters, 7(4), 427-442.

Keshavarz Ghorabaee, M., Amiri, M., Kazimieras Zavadskas, E., & Antuchevičienė, J. (2017). Assessment of third-party logistics providers using a CRITIC–WASPAS approach with interval type-2 fuzzy sets. Transport, 32(1), 66-78.

Konak, A., & Kamaci, A. (2019). Effects Of Iron-Steel Sector on Global Competıtıon, Economıc Growth and Unemployment. Yönetim ve Ekonomi Dergisi, 26(1), 49-70.

Maliene, V., Dixon-Gough, R., & Malys, N. (2018). Dispersion of relative importance values contributes to the ranking uncertainty: Sensitivity analysis of Multiple Criteria Decision-Making methods. Applied Soft Computing, 67, 286-298.

Mobin, M., Dehghanimohammadabadi, M., & Salmon, C. (2014). Food product target market prioritization using MCDM approaches. In Proc. of the 2014 Industrial and Systems Engineering Research Conference (ISERC), Montreal, Canada.

Nabavi, S. R., Wang, Z., & Rangaiah, G. P. (2023). Sensitivity Analysis of Multi-Criteria Decision-Making Methods for Engineering Applications. Industrial & Engineering Chemistry Research, 62(17), 6707-6722.

Oey, E., Noviyanti, & Sanny, L. (2018). Evaluating international market selection with multi-criteria decision-making tools-a case study of a metal company in Indonesia. International Journal of Business Excellence, 16(3), 341-361.

Özekenci, E. K. (2023). Assessing the Logistics Market Performance of Developing Countries By SWARA-CRITIC Based CoCoSo Methods. LogForum, 19(3).

Pamučar, D., Stević, Ž., & Sremac, S. (2018). A new model for determining weight coefficients of criteria in mcdm models: Full consistency method (FUCOM). Symmetry, 10(9), 393.

Papadopoulos, N., & Denis, J. E. (1988). Inventory, taxonomy and assessment of methods for international market selection. International marketing review, 5(3), 38-51.

Papadopoulos, N., & Martín Martín, O. (2011). International market selection and segmentation: perspectives and challenges. International marketing review, 28(2), 132-149.

Papadopoulos, N., Chen, H., & Thomas, D. R. (2002). Toward a tradeoff model for international market selection. International business review, 11(2), 165-192.

Rahman, S. H. (2003). Modelling of international market selection process: a qualitative study of successful Australian international businesses. Qualitative market research: An international Journal, 6(2), 119-132.

Republic of Türkiye Ministry of Trade. (2023). Target Market for Export – 2023. Retrieved from: https://www.idmib.org.tr/tr/bilgi-merkezi-duyurular-2023-yili-ihracatta-hedef-ulkeler-listesi.html (13.02.2024)

Sukoroto, S., Haryono, S., & Kharisma, B. (2020). Target Market Selection Using MCDM Approach: A Study of Rolling Stock Manufacturer. Journal of Distribution Science, 18(7), 63-72.

Topcu, I., Ülengin, F., Kabak, Ö., Isik, M., Unver, B., & Ekici, S. O. (2019). The evaluation of electricity generation resources: The case of Turkey. Energy, 167, 417-427.

Tosun, N. (2017). Target market selection in fresh fruit-vegetable sector using fuzzy VIKOR method. Journal of Management Marketing and Logistics, 4(4), 465-471.

Triantaphyllou, E., & Sánchez, A. (1997). A sensitivity analysis approach for some deterministic multi-criteria decision-making methods. Decision sciences, 28(1), 151-194.

Ünal, Z., & İpekçi Çetin, E. (2019). Gübre üreticisinin hedef pazar seçiminde bütünleşik AHP-TOPSIS yöntemi. Mediterranean Agricultural Sciences, 32(3), 357-364.

Van Dua, T., &. Thinh, H. X. (2023). RSMVC: A New-Simple Method to Select the Cutting Tool Base on Multi Criteria. Journal of Applied Engineering Science, 21(1), 167-175.

Vanegas-López, J. G., Baena-Rojas, J. J., López-Cadavid, D. A., & Mathew, M. (2021). International market selection: an application of hybrid multi-criteria decision-making technique in the textile sector. Review of International Business and Strategy, 31(1), 127-150.

Yavuz, V. (2016). Coğrafi Pazar Seçiminde Promethee ve Entropi Yöntemlerine Dayali Çok Kriterli Bir Analiz: Mobilya Sektöründe Bir Uygulama. Niğde Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 9(2), 163-177.

Yazdani, M., Zarate, P., Kazimieras Zavadskas, E., & Turskis, Z. (2019). A combined compromise solution (CoCoSo) method for multi-criteria decision-making problems. Management Decision, 57(9), 2501-2519.

Yilmaz, K., Öztürk, Y., & Burdurlu, E. (2017). Çok Ölçütlü Karar Verme Yaklaşimi Ile Mobilya İşletmeleri İçin Hedef Pazar Seçimi. İleri Teknoloji Bilimleri Dergisi, 6(3), 744-756.