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A Multi-Criteria Decision-Making Approach to Enhancing Border Security Against Irregular Migration

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ABSTRACT

International migration has become a fundamental phenomenon shaping social, political, and economic structures in the globalized world. The increase in human mobility is directly linked to the strengthening of global connections in areas such as economy, technology, culture, and education. Since the Second World War, poverty, unemployment, and political oppression have driven individuals toward countries offering better living conditions. The European Union (EU) member states and the United States are among the primary destinations for migration. The recent surge in irregular migration has led these countries to adopt stricter and more protectionist policies. Located along the EU's transit route, Türkiye is a strategic actor in border security, with the prevention of irregular migration constituting a key policy objective. This study employs the Stepwise Weight Assessment Ratio Analysis (SWARA) method to evaluate border security systems and identify priority measures. Based on the assessments of nine experts with an average of 15 years of field experience, the three most critical components were identified as border patrol activities, the use of unmanned aerial vehicles, and internal security patrols in border provinces. The findings provide a concrete roadmap for policymakers in terms of resource allocation, operational planning, and technological investment.

Keywords: *Border Security, Irregular Migration, Border Security Systems, MCDM, SWARA.*

Düzensiz Göçe Karşı Sınır Güvenliğinin Artırılmasına Yönelik Çok Kriterli Karar Verme Yaklaşımı

ÖZET

Uluslararası göç, küreselleşen dünyada sosyal, siyasal ve ekonomik yapıları etkileyen temel bir olgu hâline gelmiştir. İnsan hareketliliğindeki bu artış, ekonomi, teknoloji, kültür ve eğitim gibi alanlardaki küresel bağlantıların güçlenmesiyle doğrudan ilişkilidir. II. Dünya Savaşı'ndan bu yana yoksulluk, işsizlik ve siyasal baskılar, bireyleri daha iyi yaşam koşulları sunan ülkelere yöneltmiştir. Avrupa Birliği (AB) ülkeleri ve ABD, göçün başlıca hedef bölgeleridir. Artan düzensiz göç, bu ülkelerde daha katı politikalara yol açmıştır. AB'ye geçiş güzergâhında yer alan Türkiye, sınır güvenliğinde stratejik bir aktördür ve düzensiz göçün önlenmesi temel politika hedefidir. Bu

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çalışma, sınır güvenlik sistemlerini değerlendirmek ve öncelikli tedbirleri belirlemek için SWARA yöntemini kullanmıştır. Ortalama 15 yıllık tecrübeye sahip 9 uzmanın değerlendirmesiyle en kritik üç unsur; sınır hattında devriye faaliyetleri, insansız hava araçlarının kullanımı ve sınır illerinde iç güvenlik devriyeleri olarak belirlenmiştir. Bulgular, kaynak tahsisi, operasyonel planlama ve teknolojik yatırımlar açısından somut bir yol haritası sunmaktadır.

Anahtar Kelimeler: *Sınır Güvenliği, Düzensiz Göç, Sınır Güvenlik Sistemleri, ÇKKV, SWARA*

1. INTRODUCTION

International migration has been changing in a great number of ways in scale, scope, and complexity and has gained great political salience over the last two decades. This boast in volume and complexity has brought about diversified new connections in migration flows among unrelated countries (Triandafyllidou, 2022: 3848). Although migration is not a new phenomenon, human beings have historically sought to move in search of better opportunities, to escape poverty, conflict and for various other reasons (Castles, 2014: 5). From the economic expansion of the sixteenth century to the Industrial Revolution in the nineteenth, and from technological advancements in the twentieth century to the disruptions caused by World War I and World War II, major global events have consistently shaped migration flows. More recently, large-scale security crises such as the September 11, 2001 terrorist attacks, the global financial crisis of 2008–2009, regional conflicts in Africa, the Middle East, and Southeast Asia, the COVID-19 pandemic, and the ongoing war in Ukraine have further intensified migration dynamics and brought migration governance to the forefront of international policy agendas (Koinova, 2025: 424) in a more liable way to deal with as a whole.

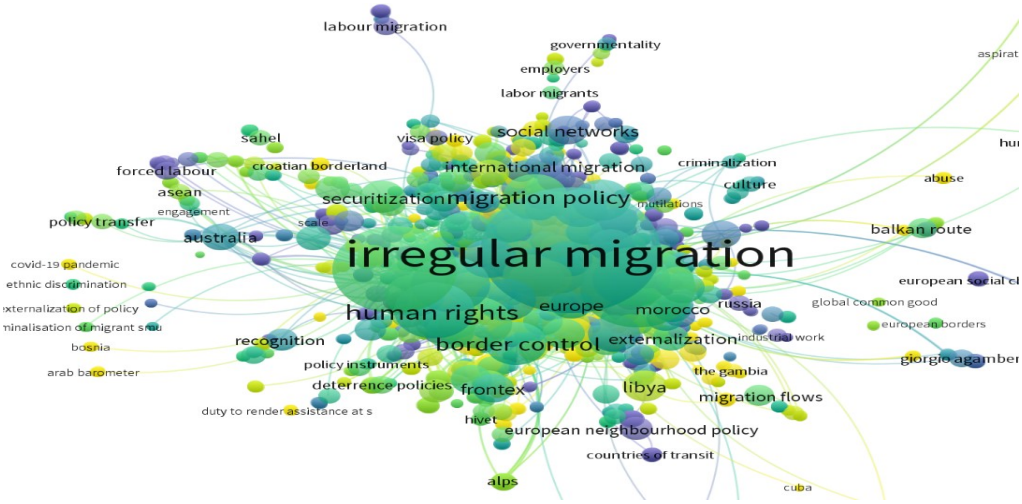
Protecting territorial integrity and ensuring the safety of citizens are fundamental responsibilities of the modern state. Türkiye, located along key transit routes to the European Union, and surrounded by regions experiencing chronic instability—such as Afghanistan, Iraq, Syria, and Ukraine—faces sustained pressures from irregular migration. Currently hosting one of the largest refugee populations in the world, Türkiye has adopted increasingly robust measures to strengthen border security. One notable initiative is the establishment of the National Coordination and Joint Risk Analysis Center (UKORAM) under the Ministry of Interior, which centralizes border security management and fosters inter-agency cooperation (UKORAM, 2023).

The academic literature on border security and irregular migration has expanded substantially, with new contributions emerging annually. Key studies have explored diverse aspects of the topic, including the impact of international migration on national security (Adamson, 2006), border management in Nigeria (Ogbonna et al., 2023), border security and irregular immigration in South Africa (Vorvornator, 2024), unlawful migration along the EU's eastern Belarusian border (Koinova, 2024), irregular migration and security dynamics (Andersson, 2022), global approaches to border control (Lori & Schilde, 2021), and border security in Southeastern Europe (Geddes & Taylor, 2013). Other significant works include research on the Turkish-Iranian border wall (Akdemir & Akman,

2022), public perceptions of globalization and migration (Köşk & Özbek, 2017), the paradox of borders in an increasingly interconnected world (Newman, 2006), and the implications of border walls for irregular migration (Jones, 2016). Furthermore, studies have addressed the conceptual underpinnings of border security (İstanbullu & Emiroğlu, 2022), border-related injustices (Anderson et al., 2009), and strategies for managing forced migration (Watkins, 2021).

However, an analysis of publications indexed in the Web of Science reveals that, although there is substantial focus on irregular migration, human rights, and border control, there is a notable absence of studies employing MCDM techniques to compare border security measures and irregular migration control strategies. This gap indicates a valuable avenue for future research.

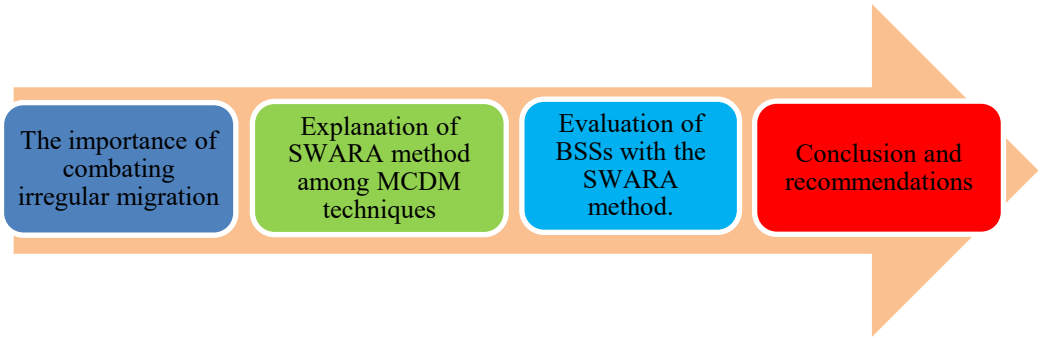
Figure 1. Studies acquainted with irregular migration (Designed by Authors)



MCDM methods support decision-makers in addressing complex problems that require the evaluation of numerous and often interrelated factors. These methods are widely applied in various domains of human activity where prioritization, ranking, or weighting of alternatives is necessary (Abdulvahitoğlu & Altunok, 2025). MCDM techniques have been effectively utilized in diverse applications such as determining optimal locations for gendarmerie stations (Abdulvahitoğlu et al., 2021), selecting the police station location with the largest coverage model (Sarıkaya et al., 2020), analyzing the underlying factors contributing to juvenile delinquency through the SWARA method (Abdulvahitoğlu, 2023), designing border crossing procedures using MCDM-based simulation approaches (Sawicki & Sawicki, 2025), and evaluating the operational effectiveness of coast guard units in the Eastern Adriatic (Sunko et al., 2024), among others. These examples underscore the versatility and practical value of MCDM methodologies in supporting evidence-based and strategic decision-making across a range of security, social, and administrative contexts.

In the literature, there are a large number of publications in different fields using SWARA method, which is one of the MCDM methods. It is seen that SWARA method, which is one of the most recent of the methods proposed for MCDM problems (Kersuliene et al., 2010), has been used in problems such as house plan shape selection (Juodagalvienė et al., 2017), Prioritizing renewable energy sources in Brazil (Almeida et al., 2025), Analysis of consumer behavior in global green tourism (Chen and Liu, 2025) and many more.

Figure 2. Stages of the Study



In this study, after explaining the importance of border security, the components and functions of BSS will be explained. Subsequently, the importance levels of BSSs will be found by SWARA, one of the MCDM methods, by taking the opinions of the professionals with field experience serving in the Law Enforcement Authorities. Thus, a model will be proposed to save time and effort and increase efficiency by prioritizing BSS components with high importance levels. The stages of the study are shown in Figure 2.

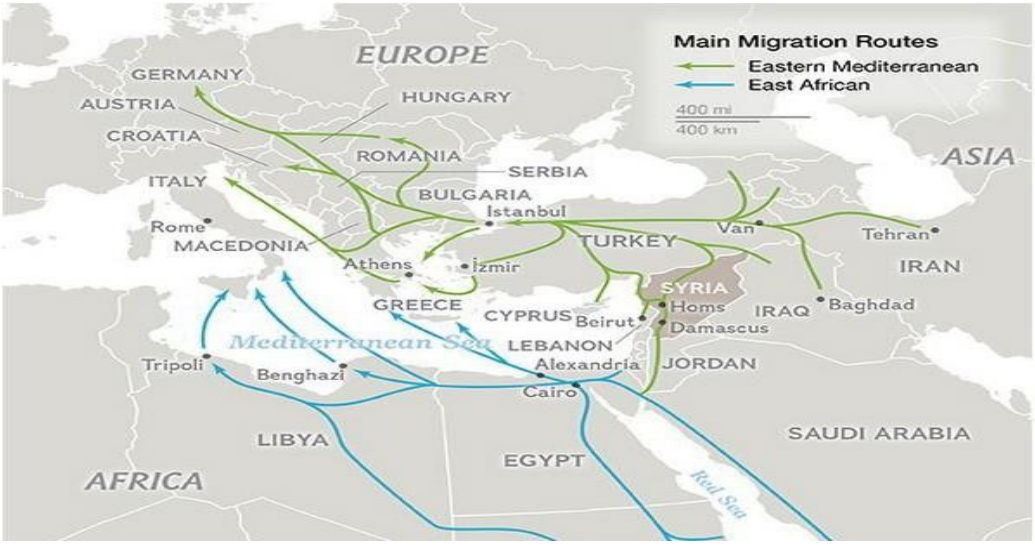
2. MATERIAL AND METHODS

BSSs are crucial for preserving internal security, stopping unauthorized migration, and defending national sovereignty. Effective management of these systems necessitates weighing several, frequently incompatible criteria. Methods known as MCDM offer an organized and impartial way to evaluate a number of variables, including infrastructure, technology, cost, labor, and operational effectiveness. MCDM facilitates more effective resource allocation and strategic planning by making it possible to prioritize and compare options. By using scenario-based analysis, it also improves the capacity to react to changing security threats. Therefore, using MCDM into border security decision-making enhances system performance now and aids in the creation of long-term policies. The use of MCDM techniques has grown to be an essential tool for making well-informed and efficient decisions in a security environment that is becoming more complicated.

2.1. Border Security Systems (BSS)

Furthermore transnational population movements have ascended to a pivotal position within global security discourse, largely propelled by apprehensions that such mobility might serve as a vector for the transnational proliferation of extremist violence. While these fears are not entirely baseless, they warrant careful evaluation within the expansive framework of how cross-border migration—bearing both advantageous and adverse ramifications—intersects with fundamental national security imperatives (Adamson, 2006: 165-199). The Routes Most Commonly Used by Irregular Migrants Around the World (Bundle, 2025) are shown in Figure 3 below.

Figure 3. Routes Most Commonly Used by Irregular Migrants Around the World (Bundle, 2025)



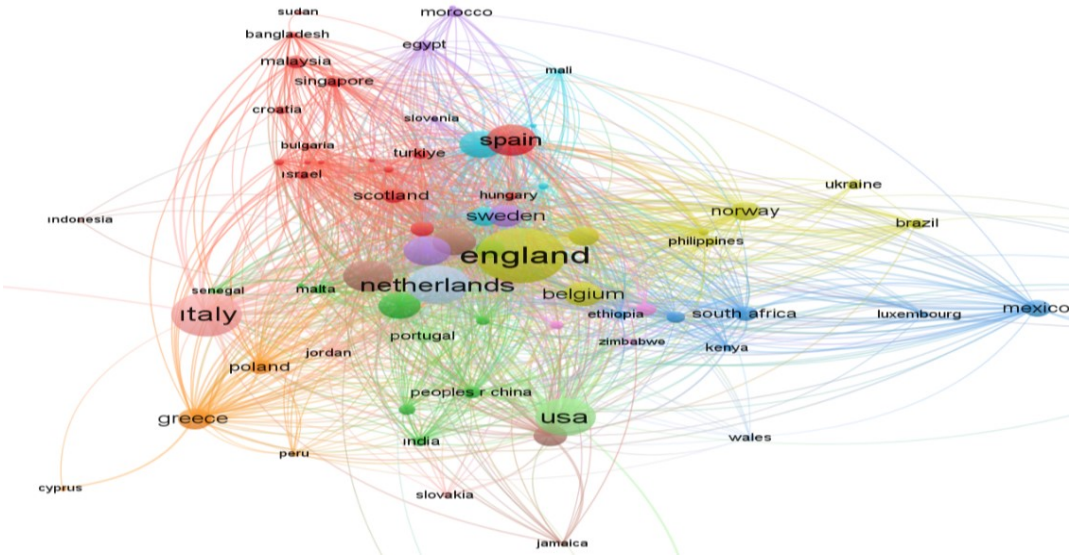
As cross-border migration continues to grow, many governments have started to treat border control as a key part of their national security policies. This shift has changed the meaning of borders—from simple geographical lines to active spaces where security decisions are made (Mountz, 2010). Countries with strong surveillance systems now use risk-based methods to track and manage migration, often trying to stop potential threats before they reach national territory (Amoore & De Goede, 2008). This reflects a broader change in how security is understood: rather than just protecting land, states now focus on managing the movement of people and possible risks across regions (Walters, 2006). As a result, the way migration is controlled has raised serious questions about legal rights, ethics, and how people on the move are treated (Fassin, 2011).

The shift towards risk-based approaches in managing migration and enhancing border security has not only influenced the understanding of security but also shaped the academic focus on migration studies (Karamanidou & Kasparek, 2020). As depicted in Figure 4,

countries with advanced surveillance systems, such as the UK, Italy, Spain, and the Netherlands in Europe, alongside the United States in the Americas, have been central to research on border security and irregular migration. This pattern highlights the increasing academic attention given to irregular migration issues in countries directly affected by it, emphasizing the growing importance of this topic within national discourse.

As seen in Figure 4, border security and the center of the studies on irregular migration as mentioned above the UK, Italy, Spain and Spain from EU countries with a high level of prosperity, such as the UK, Italy, Spain and While the Netherlands is located in the Netherlands, the USA is located in the American continent. Inferred from this the result is that in countries experiencing the problem of irregular migrants, more academic studies are carried out and importance is attached to this issue throughout the country.

Figure 4. Countries where academic studies on irregular migrants and border security are conducted (Created by the authors).



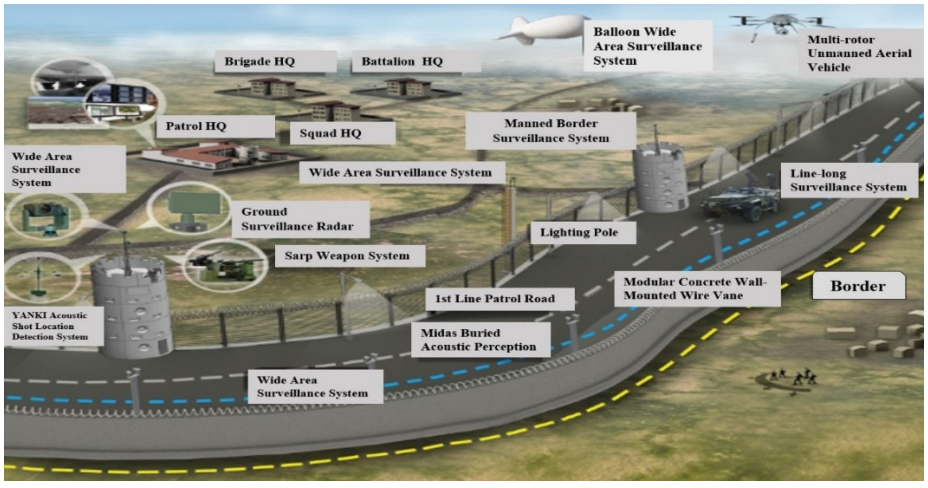
Technological advancements such as geospatial intelligence, biometric systems, and digital databases have been widely recognized as critical components of contemporary border management. For example, Broeders (2007) highlights that digital border systems play a central role in the modern classification and identification of migrants, while Andersson (2015) demonstrates how security technologies are increasingly being integrated into Europe's strategy to combat irregular migration. Studies on border permeability further suggest that geospatial data serve as valuable tools in identifying vulnerable zones along land borders (Broek et al., 2014). These technological systems contribute significantly to

border security operations by enhancing situational awareness and facilitating the enforcement of administrative controls (Savatic et al., 2024).

However, empirical evidence indicates that even highly sophisticated border systems suffer from substantial limitations. Ekmekcioğlu and Yıldız (2023) observe that frontline bureaucrats often regard physical and technological measures as inadequate for fully preventing irregular crossings—a finding echoed by Nshimbi (2021), who notes that advanced technological infrastructure at EU borders frequently fails to deter determined migrants. Moreover, as Grundler (2024) and Angulo-Pasel (2019) argue, restrictive entry policies and extraterritorial measures can inadvertently exacerbate irregular migration by increasing both the risks and costs associated with informal routes. Compounding these challenges, Suber (2023) underscores how smuggling networks have adapted to intensified border enforcement, with growing corruption at checkpoints further complicating the security landscape.

Comparative case studies reveal that physical and technological controls alone are insufficient to fully address the complexities of irregular migration. For instance, Dalaman and Kayalak (2024) demonstrate that repatriation centers and other border security measures in Türkiye often fall short in effectively managing migration flows, primarily due to a failure to account for the multifaceted socio-political, economic, and humanitarian drivers of movement. Consequently, overly securitized environments may not only prove ineffective in deterring irregular migration but may also aggravate human rights concerns and contribute to the marginalization of vulnerable populations (Angulo-Pasel, 2019; Suber, 2023). As emphasized in recent discussions on the need to balance enforcement with human rights protections and to improve coordination between state and non-governmental actors, integrated approaches that combine security with humanitarian considerations are essential (Yengkangyi et al., 2023).

Figure 5. Border Security Systems (Aselsan, 2025)



BSSs refer to comprehensive networks composed of both fixed and mobile elements—including physical infrastructure, barriers, technological surveillance systems, seismic detection, identification and early warning components, as well as supporting lighting, imaging, and communication tools—installed along national borders. These systems aim to prevent irregular crossings; combat terrorism, smuggling, and other forms of transnational crime; detect and identify threats and movements approaching the border line; and enable quicker responses by border troops to incidents. An illustration of the BSS structure is provided in Figure 5.

BSSs are systems that aim to protect and control a country's borders. Components of BSS;

A security wall is a high-strength barrier system formed by joining portable concrete barriers three or four metres high along the boundary and topped with barbed wire.

A border patrol road is a road built parallel to the wall for patrol vehicles and foot patrols to control the border line. Patrol vehicles used by border forces are mostly tactical wheeled armored vehicles.

Surveillance vehicles are the vehicles used by border troops that have the opportunity to conduct surveillance day and night with the radar etc. equipment on them.

Surveillance towers are towers that are installed at 35-75 high dominant points on the border line and on which detection systems such as cameras, sensors, radars, sentries, etc. are placed.

Camera is the equipment placed for the control of the border line, which allows visual monitoring of the border day and night.

Sensors are systems that are sensitive to live mobility and detect movements day and night.

High security wire fences are high security wire fences, usually three metres high, built where there is no security wall or to support security walls.

Lighting is the lighting system built on the border line in order to increase the effectiveness of surveillance systems.

A ditch or embankment, which is constructed by us to support the security wall of the ditch, constitutes the measures taken in rivers that form the border.

Unmanned Aerial Vehicles (UAVs) are remotely controlled aircraft used to detect border movements from the air within the border region.

Intelligence activities involve the collection of information for activities such as preventing irregular migration, capturing those who organize irregular migration, and apprehending irregular immigrants, among others.

The patrol activities carried out by border units along the border line are operations performed to prevent irregular crossings at the border or to oversee border security systems.

The patrol activities conducted by internal security units in border provinces consist of operations executed by the internal security institutions of provinces located along the border, aimed at combatting irregular migration.

The patrol activities carried out by internal security units, which encompass actions taken by all internal security institutions across the country within the scope of combating irregular migration, are also factors that directly affect the fight against irregular migration.

Among the components of the BSSs established along our land borders, the combination of the security wall, high-security wire fence, lighting, patrol roads, patrol vehicles, and pedestrian patrols is illustrated in Figure 6.

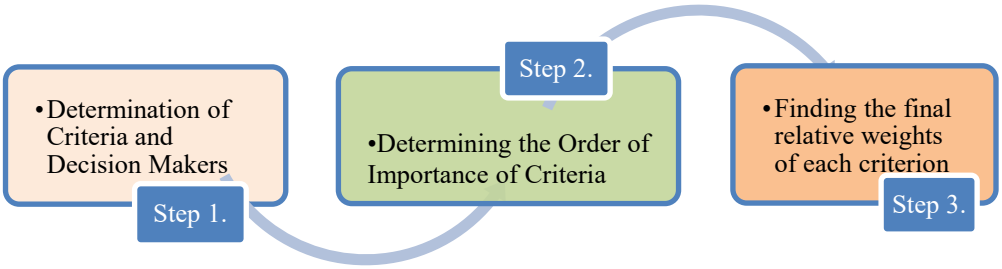
Figure 6. The combination of the components of BSS (Hürriyet, 2023)

2.2. SWARA Method

In 2010, Keršuliene et al. created the SWARA approach to evaluate experts' knowledge, experience, and subjective judgements (Keršuliene et al., 2010; Maghsoodi et al., 2018). As an MCDM technique, SWARA is primarily utilized to determine the relative weights of evaluation criteria. Its expert-oriented nature, which emphasizes the structured incorporation of expert opinions, has been widely acknowledged in the literature (Zavadskas et al., 2019; Adalı & Işık, 2017). Although numerous MCDM methods exist, SWARA has gained significant popularity due to its methodological simplicity and efficiency in deriving criteria weights (Çakır & Akar, 2017; Stanujkic et al., 2015; Radovic

& Stevic, 2018). The SWARA methodology typically involves a three-step process, which is illustrated in Figure 7. below.

Figure 7. Steps of SWARA method



First Stage: Identifying the Decision Makers and Criteria. The decision problem's criteria and the decision-makers who will assess them are decided in the first step. The decision issue involves m decision makers (Km) and n criteria (Cn).

Second Stage: Establishing the Criteria's Priority Order. According to Keršuliene and Turksis (2011), experts evaluate the relevance of each criterion and rank them from most to least essential. The criteria indicated in the preceding phase are identified by calculating their respective relevance levels, as well as the j^{th} criterion's (j+1) relative importance to the criterion. The symbol for this value is *"s_j"*. Decision-makers give the most important feature of this assessment a perfect score of 1.00. They offer values for the remaining parameters, which range from 0 to 1 and are expressed in multiples of 5. After determining the *"k_j"* and *"q_j"* coefficients, the significance levels selected by each decision maker for each criteria, *"w_j"*, are computed. For every criteria, the *"k_j"* coefficients are independently determined by each expert using formula (1).

$$k_j = \begin{cases} 1, & j = 1 \\ s_j + 1 & j > 0 \end{cases} \quad (1)$$

The weights determined by each expert for each criterion using formula (2) are shown as *"q_j"*

$$q_j = \begin{cases} 1, & j = 1 \\ \frac{q_{j-1}}{s_j}, & j > 1 \end{cases} \quad (2)$$

Using the formula (3), each expert estimates the relative importance of each condition.

$$w_j = \frac{q_j}{\sum_{j=1}^{n} q_j} \quad (3)$$

Third Stage: Assessing Each Criteria's Final Relative Weights. The arithmetic mean of the relative weights "w_j" obtained from expert assessments is utilised to ascertain the ultimate result in computations involving several experts (Zolfani and Chatterjee, 2019).

3. DISCUSSION AND FINDINGS

The SWARA approach, which is a MCDM technique, will be used in this study to assess BSS components and activities aimed at preventing irregular migration. The main goal is to use expert judgment in a methodical and controlled way to assess the relative value of different metrics and system components. The study attempts to determine the most important elements that influence how well border security operations fight irregular migration by giving weights to each criterion. The SWARA technique makes it possible to incorporate expert viewpoints and promotes more informed, fact-based strategic planning and policy decisions. In this context, interviews were conducted with nine experts between March 15 and May 1, 2024. Seven of these have at least 20 years of field experience, are law enforcement practice specialists who teach professional courses at the Gendarmerie and Coast Guard Academy, six have master's degrees, and one has a doctorate. The other two experts are a professor with 10 years of teaching experience and a security forces veteran who served for 25 years, including border security operations, before retiring and spending the last five years as a university lecturer. Table 1 below lists the factors influencing border security and the fight against irregular migration.

Table 1. Factors influencing border security and the fight against irregular migration

Row	Code	Factors
1	C_1	Patrol activities carried out by internal security units in border provinces
2	C_2	Patrol activities carried out by internal security units within the country's borders
3	C_3	Patrol activities carried out by border security forces on the border
4	C_4	Security wall,
5	C_5	Border patrol route,
6	C_6	Patrol vehicles,
7	C_7	Day and night surveillance devices such as radar,
8	C_8	Watch towers,
9	C_9	Camera
10	C_{10}	Sensor
11	C_{11}	High security wire fence,
12	C_{12}	Lighting
13	C_{13}	Ditch or dike
14	C_{14}	Unmanned aerial vehicles
15	C_{15}	Intelligence activities
16	C_{16}	Legal legislation regarding irregular immigrants

In order to provide a more thorough and accurate evaluation process, in-person interviews with specialists were preferable when using the SWARA technique. To solve the decision-making issue this study looked at, the SWARA computation stages were used. The method's first stage, which entails prioritizing the choice criteria, kicked off the procedure. Table 2 displays the individual rankings that each expert at this point supplied. For example, while the third expert (DM_3) ranked "unmanned aerial vehicles" as the most

important demand, the first expert (DM_1) ranked "patrol activities carried out by border security forces at the border" as the most important criterion.

Table 2. Prioritization of factors affecting border security and the fight against irregular migration

		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
DM_1	Factor	C_3	C_{14}	C_{10}	C_{11}	C_1	C_4	C_7	C_8	C_9	C_{12}	C_2	C_{15}	C_5	C_6	C_{16}	C_{13}
	s_j	-	0.95	0.9	0.85	0.8	0.75	0.75	0.7	0.65	0.6	0.55	0.5	0.45	0.4	0.35	0.3
DM_2	Factor	C_3	C_{14}	C_5	C_4	C_8	C_6	C_7	C_9	C_{10}	C_{12}	C_2	C_1	C_{11}	C_{13}	C_{15}	C_{16}
	s_j	-	0.95	0.9	0.85	0.8	0.75	0.7	0.65	0.6	0.55	0.5	0.45	0.4	0.35	0.3	0.25
DM_3	Factor	C_{14}	C_3	C_1	C_7	C_{10}	C_5	C_4	C_2	C_9	C_8	C_6	C_{11}	C_{12}	C_{13}	C_{15}	C_{16}
	s_j	-	0.95	0.9	0.85	0.8	0.75	0.7	0.65	0.6	0.55	0.4	0.35	0.25	0.2	0.15	0.1
DM_4	Factor	C_3	C_{15}	C_1	C_4	C_{14}	C_{12}	C_8	C_9	C_7	C_{16}	C_{11}	C_{10}	C_2	C_5	C_6	C_{13}
	s_j	-	0.95	0.9	0.85	0.8	0.75	0.7	0.65	0.6	0.55	0.5	0.45	0.4	0.3	0.25	0.1
DM_5	Factor	C_{14}	C_{10}	C_7	C_9	C_{11}	C_{12}	C_4	C_5	C_6	C_8	C_{13}	C_{15}	C_{16}	C_3	C_1	C_2
	s_j	-	0.9	0.85	0.8	0.75	0.7	0.65	0.6	0.55	0.5	0.45	0.4	0.35	0.3	0.2	0.15
DM_6	Factor	C_3	C_2	C_1	C_5	C_4	C_8	C_{11}	C_9	C_{12}	C_6	C_7	C_{14}	C_{15}	C_{10}	C_{16}	C_{13}
	s_j	-	0.95	0.9	0.85	0.8	0.75	0.75	0.7	0.65	0.6	0.55	0.5	0.45	0.35	0.3	0.25
DM_7	Factor	C_7	C_8	C_6	C_5	C_4	C_{12}	C_{14}	C_{10}	C_9	C_{15}	C_{11}	C_1	C_3	C_2	C_{16}	C_{13}
	s_j	-	0.95	0.9	0.85	0.8	0.75	0.65	0.6	0.55	0.5	0.45	0.35	0.3	0.25	0.25	0.2
DM_8	Factor	C_1	C_3	C_2	C_{16}	C_{15}	C_4	C_{11}	C_{14}	C_5	C_7	C_6	C_8	C_9	C_{10}	C_{12}	C_{13}
	s_j	-	0.95	0.9	0.85	0.8	0.75	0.7	0.65	0.6	0.55	0.5	0.45	0.35	0.25	0.2	0.1
DM_9	Factor	C_{10}	C_{11}	C_{12}	C_{14}	C_9	C_3	C_7	C_4	C_5	C_8	C_6	C_{15}	C_1	C_2	C_{16}	C_{13}
	s_j	-	0.95	0.9	0.85	0.8	0.75	0.7	0.65	0.6	0.55	0.5	0.45	0.4	0.35	0.3	0.25

Following each expert's determination of the criteria's relative relevance levels, additional computations were performed using formula (1)–(3). Table 3 displays examples of computations performed by Decision Maker-1 (DM_1).

Table 3. Evaluation made by DM_1 using the SWARA method

DM_1	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
	C_3	C_{14}	C_{10}	C_{11}	C_1	C_4	C_7	C_8	C_9	C_{12}	C_2	C_{15}	C_5	C_6	C_{16}	C_{13}
s_j		0.95	0.9	0.85	0.8	0.75	0.75	0.7	0.65	0.6	0.55	0.5	0.45	0.4	0.35	0.3
k_j		1.95	1.9	1.85	1.8	1.7	1.75	1.7	1.65	1.6	1.55	1.5	1.45	1.4	1.35	1.3
q_j	1	0.5128	0.2699	0.1459	0.0811	0.0477	0.0272	0.016	0.0097	0.0061	0.0039	0.0026	0.0018	0.0013	0.001	0.0007
w_j	0.47	0.241	0.1269	0.0686	0.0381	0.0224	0.0128	0.0075	0.0046	0.0029	0.0018	0.0012	0.0008	0.0003	0.0004	0.0001

Each expert opinion was subjected to an independent replication of the sample computations performed in Table 6 for DM_1. The arithmetic average of the acquired "wj" values was used to determine the final weights. Table 4 displays these weights.

Table 4. Final ranking of criteria according to decision makers' evaluation

Factors	DM_1	DM_2	DM_3	DM_4	DM_5	DM_6	DM_7	DM_8	DM_9	w_j
C_1	0.038	0.001	0.126	0.127	0.001	0.127	0.002	0.469	0.001	0.099
C_2	0.002	0.002	0.008	0.001	0.000	0.241	0.000	0.127	0.000	0.042
C_3	0.47	0.469	0.24	0.469	0.000	0.471	0.001	0.241	0.022	0.265
C_4	0.022	0.068	0.013	0.068	0.015	0.038	0.038	0.022	0.008	0.032
C_5	0.001	0.127	0.022	0,000	0.009	0.069	0.068	0.005	0.005	0.034
C_6	0.000	0.022	0.002	0.001	0.006	0.003	0.126	0.002	0.002	0.018
C_7	0.013	0.013	0.068	0.005	0.129	0.002	0.468	0.003	0.013	0.079
C_8	0.008	0.038	0.003	0.013	0.004	0.022	0.24	0.001	0.003	0.037
C_9	0.005	0.008	0.005	0.008	0.072	0.007	0.005	0.001	0.038	0.016
C_{10}	0.127	0.005	0.038	0.001	0.239	0.000	0.008	0.000	0.469	0.099
C_{11}	0.069	0.001	0.002	0.002	0.041	0.012	0.002	0.013	0.241	0.043
C_{12}	0.003	0.003	0.001	0.022	0.024	0.004	0.022	0.001	0.127	0.023
C_{13}	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.001
C_{14}	0.241	0.241	0.469	0.038	0.453	0.001	0.013	0.008	0.068	0.17
C_{15}	0.001	0.001	0.001	0.241	0.002	0.001	0.004	0.038	0.001	0.032
C_{16}	0.000	0.000	0.000	0.003	0.001	0.000	0.001	0.068	0.001	0.008

The ranking of the importance levels of the final required materials is shown in Table 5.

Table 5. Final ranking based on combined criteria weights

Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Factor	C_3	C_{14}	C_1	C_{10}	C_7	C_{11}	C_2	C_8	C_5	C_4	C_{15}	C_{12}	C_6	C_9	C_{16}	C_{13}
Weights		0.170	0.099	0.099	0.079	0.043	0.042	0.037	0.034	0.032	0.032	0.023	0.018	0.016	0.008	0.001

According to Table 5, the top three most significant measures identified were "Patrol activities conducted by border security forces at the border" (C3), "Unmanned aerial vehicles" (C14), and "Patrol activities carried out by internal security units in border provinces" (C1), followed closely by "Sensor" technologies. These results suggest that practitioners consider both personnel-based operations and high-tech surveillance methods to be essential. The emphasis on C3 and C14 supports the findings of Andersson (2022) and Lori & Schilde (2021), who highlight the effectiveness of physical border patrols and UAVs in preventing irregular migration. Similarly, the high ranking of C1 underscores the importance of coordinated efforts between internal and border security, echoing the

arguments made by Geddes & Taylor (2013). From a policy standpoint, focusing on these areas can inform strategic resource distribution—bolstering on-the-ground patrol units, investing in UAV technology, and enhancing collaboration between different security agencies. Such steps are likely to boost both the preventive and reactive capabilities of border management systems.

4. CONCLUSION

This study has explored the influence of BSS components in ensuring border security and has proposed a decision-support model to assist policymakers in devising strategies to mitigate irregular migration. A key limitation of the research stems from the inherent challenges of accessing numerical data due to national security constraints, which precludes the possibility of conducting purely quantitative analyses. Given the fundamental management principle that "what cannot be measured cannot be managed," it becomes imperative to establish mechanisms for quantifying border-related incidents and conduct systematic evaluations based on these measurements. To overcome this limitation, subjective data was gathered through structured interviews with highly experienced professionals who have served extensively in internal security operations, border enforcement against irregular migration, and strategic roles at the Law Enforcement Auyhority. These subjective insights were subsequently transformed into objective data through the SWARA technique. The findings enabled the determination of the relative significance of different BSS components, offering valuable decision-support tools for policymakers and contributing to the refinement of border management strategies and the optimization of security frameworks. The first three most important measures were determined as “Patrol activities carried out by border security forces at the border”, “Unmanned aerial vehicles”, “Patrol activities carried out by internal security units in border provinces” and “Sensor”. This study underscores the necessity of integrating quantitative methodologies into future research endeavors should numerical data on irregular migration and counter-migration measures become available. The proposed model provides a foundational framework that, with further empirical validation, can facilitate a more comprehensive and data-driven approach to border security management. Additionally, expanding the scope of research through broader participatory studies involving experts from diverse institutions responsible for border security could enhance the robustness of findings. The application of alternative MCDM methodologies, coupled with sensitivity analyses, would further strengthen comparative assessments and enhance the precision of policy recommendations. Such advancements would not only refine strategic decision-making but also ensure a more adaptive and resilient border security infrastructure in response to evolving migration dynamics.

Statement of Research and Publication Ethics

In all processes of the article, the principles of research and publication ethics of Manisa Celal Bayar University Journal of Social Sciences Institute were followed.

Authors Contribution Rates to the Article

The authors contributed equally to the work.

Declaration of Interest

The authors have no conflict of interest with any person or organization.

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