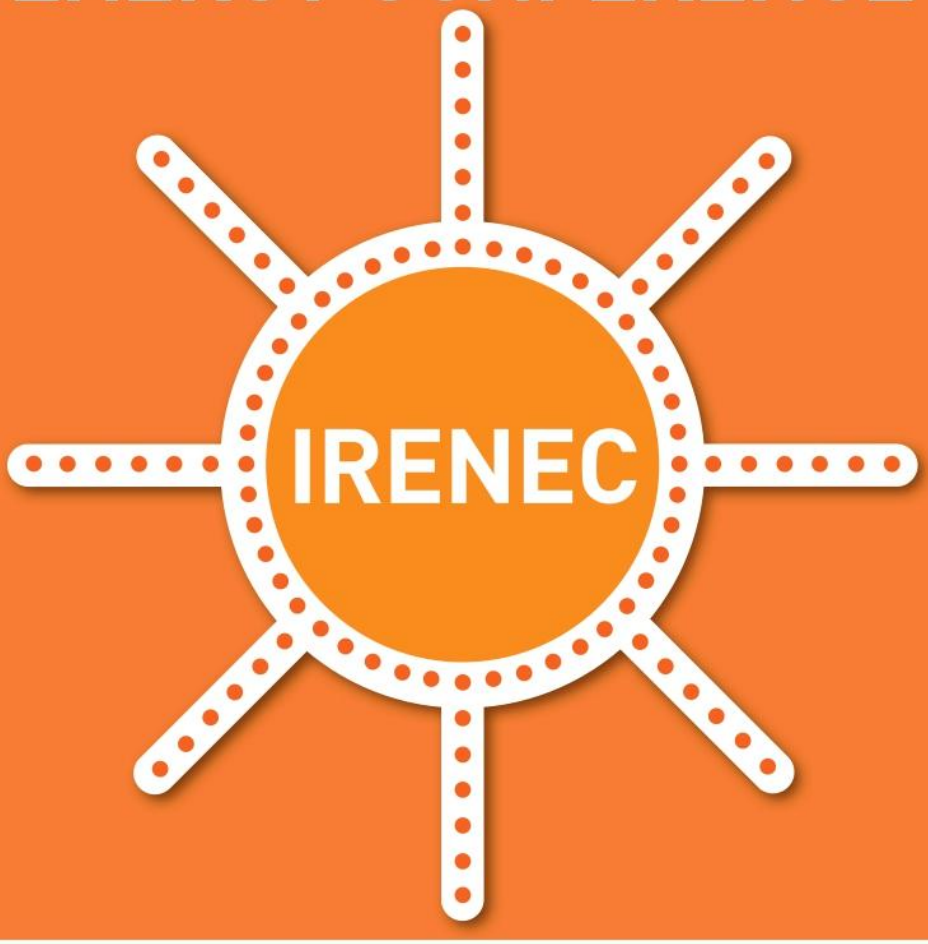
15th INTERNATIONAL 100% RENEWABLE ENERGY CONFERENCE



IRENEC 2025

PROCEEDINGS

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RENEWABLE ENERGY ASSOCIATION

EUROSOLAR Türkiye

Editors

Tanay Sıdkı Uyar

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Dear Participants,

Tanay Sıdkı Uyar

Conference Chair,
IRENEC 2025

In our journey of promoting 100% Renewable Energy, we have arrived at the 15th stop where we shall again share our research results and other achievements.

Every day we are discovering and practicing the good quality of renewable energies. The genie is out of the bottle. It is time to use the good quality of human beings to guide this opportunity effectively to the destination. The qualities of human beings can play its role if the individuals and countries talk together and define problems correctly and find solutions that can be implemented.

Renewable energy resources at each corner of the atmosphere are ready to be converted to electricity and process heat locally when needed. Kinetic energy of the moving air, chemical energy stored in biomass, heat and light of the sun and geothermal resources are available all over our planet earth free of charge. As the main energy source of living space on earth, sun and its derivatives were available before, are available today and will be available in the future.

Global support provided for the renewable energy made the market penetration of renewables possible. Today wind and solar energy became the cheapest way of producing electricity in many parts of the World.
Cities and countries who are trying to reach 100% renewable energy mix are working on preparing the infrastructure necessary to be able to supply more renewable energy for industry, transportation and buildings by smart grids and renewable energy storage systems.

Since renewable energy is available at every corner of our atmosphere, Community Power (the involvement of the local people individually or through their cooperatives and municipalities in the decision-making process and ownership of their energy production facilities) is becoming the most effective approach for transition to 100% renewable energy future.

During IRENEC 2025 we shall share and learn from the global experiences on difficulties, barriers, opportunities and solutions for transition to 100% renewable energy societies and make our contribution to Global Transition to 100% Renewable Energy.

Best Regards,

Tanay Sıdkı Uyar

Conference Chair, IRENEC 2025

President, Renewable Energy Association of Turkey

(EUROSOLAR Turkey)

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Full Research Papers

THE EFFECT OF SWOT ANALYSIS ON THE SUSTAINABILITY APPROACH OF A LEADING TURKISH MARITIME CONSTRUCTION COMPANY

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Abstract. The EU's mandatory Corporate Sustainability Reporting Directive (CSRD) is based on the widely used GRI framework but significantly introduces the concept of "dual materiality", which requires companies to report both their impacts on society and the environment, and how sustainability issues affect the company itself. This study practically demonstrates the importance of a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis to be applied at the initial stage to reveal this "double materiality" when preparing a sustainability report for a company. In the context of the application in question, the design of the SWOT analysis, the objectives of the questions, the interpretation of the analysis results, and the effects of the findings on the sustainability report study and sustainability goals are presented.

Keywords: SWOT Analysis, Maritime Construction, Sustainability.

1 Introduction

In the maritime construction sector, sustainability is becoming a strategic priority as companies face increasing environmental challenges and regulatory expectations. MC Co., a prominent Turkish firm founded in 1986, has grown from a small aggregate operation into the country's leading maritime construction company, specializing in dredging and coastal infrastructure. Over the past four decades, the company has expanded its service portfolio and technical capacity, completing numerous domestic and international projects with a daily dredging capacity of 18,000 cubic meters and a dedicated fleet of specialized vessels.

Guided by a long-standing commitment to responsible operations, MC Co. has embedded sustainability into its corporate philosophy. Its operations—ranging from underwater concrete works and breakwater construction to luxury real estate development—are anchored in the principle of minimizing environmental impact while delivering high-quality infrastructure solutions. With 101 employees and facilities

based in Tuzla, Istanbul, the company has demonstrated a consistent focus on innovation, compliance, and social responsibility.

As part of its 2023 sustainability efforts, MC Co. initiated the development of a formal sustainability report. Following expert guidance, a SWOT analysis was conducted to uncover both internal capabilities and external risks through the lens of double materiality, in line with the EU's Corporate Sustainability Reporting Directive (CSRD). Two facilitated sessions involving 32 employees across operational levels were held to assess organizational strengths and sustainability challenges. The results of this analysis formed the foundation for structuring the company's sustainability roadmap and aligning its strategic goals with broader environmental and societal priorities.

2 Sustainability Standards and SWOT Analysis

The Global Reporting Initiative (GRI) framework remains one of the most widely adopted tools for sustainability reporting, offering organizations structured guidance to disclose their environmental, social, and governance (ESG) performance transparently (GRI, 2021). Building upon this foundation, the European Union introduced its own set of mandatory reporting standards under the Corporate Sustainability Reporting Directive (CSRD), which became effective in 2024. Unlike the GRI, which primarily encourages a holistic approach to reporting, the CSRD incorporates a more stringent and forward-looking principle: double materiality. This principle requires companies to report not only on how their operations effect the environment and society but also on how external sustainability-related issues influence the company's financial condition and performance, both locally and globally (Primec & Belak, 2022).

This dual materiality perspective compels companies to account for their societal and environmental responsibilities while simultaneously identifying how sustainability trends and risks impact internal operations and long-term resilience. As a significant advancement from traditional single materiality frameworks, this approach broadens the scope of sustainability reporting, requiring organizations to embed ESG considerations more deeply into strategic planning and enterprise risk management (Primec & Belak, 2022).

Double materiality requires companies to assess sustainability from two perspectives. First, they look "inside-out" at their own impact on the world (Impact Materiality). Second, they look "outside-in" at how sustainability issues create financial risks and opportunities for their business (Financial Materiality). In addition to regulatory alignment, organizational experience underscores the importance of workforce awareness and education in achieving sustainability goals. Practical engagements have shown that employee knowledge on topics such as climate change, biodiversity, energy efficiency, and the United Nations' Sustainable Development Goals (SDGs) plays a pivotal role in operationalizing sustainability strategies. A workforce that is informed and responsive to global environmental and social challenges enhances the

company's capacity to implement effective ESG measures. Therefore, any robust sustainability strategy—especially under the double materiality framework—must consider the level of ESG literacy across all organizational levels, from blue-collar staff to senior executives (Baumüller & Sopp, 2021).

The SWOT framework is widely recognized as a strategic tool for evaluating both internal capabilities and external conditions. While traditionally employed in corporate strategy and marketing contexts, its value has increasingly been acknowledged in sustainability planning, particularly under frameworks like the CSRD where a broader materiality scope is mandated. In the context of double materiality, SWOT analysis serves not merely as a diagnostic tool but as a mechanism to uncover the interconnections between internal performance drivers and external environmental and social dynamics. By systematically identifying key internal strengths and vulnerabilities, as well as external pressures and growth enablers, organizations can establish a structured path toward resilience and long-term sustainability integration.

The SWOT framework offers a systematic approach for organizations to evaluate both their internal capabilities and the external environment within a strategic context.

- Strengths (S) refer to those internal attributes or resources that provide a competitive edge or actively support the achievement of organizational goals.
- Weaknesses (W) point to internal shortcomings or constraints that may hinder progress or undermine competitiveness.
- Opportunities (O) reflect external trends or conditions that, if effectively leveraged, can support: organizational growth, improved performance, or long-term sustainability.
- Threats (T) encompass external risks or challenges that may pose obstacles to achieving strategic objectives.

When conducted properly, SWOT analysis can enhance an organization's situational awareness. It equips decision-makers with a well-rounded perspective, enabling them to formulate strategies that are responsive to both internal realities and external pressures. This is particularly relevant in the context of sustainability, where organizations must navigate complex and interrelated social, environmental, and economic dimensions.

As is well established in the literature, strategic planning and marketing are inherently interconnected. Regardless of the product or service offered, organizations must engage in ongoing evaluative processes to ensure market relevance and operational effectiveness. Within this context, SWOT analysis offers valuable insights at multiple stages of strategy formulation. Particularly in the early phases of planning for technological innovation or organizational change, conducting a SWOT assessment provides clarity on both internal readiness and external alignment.

Strategic evaluations typically involve two key dimensions: internal analysis and external analysis. As illustrated in Table 1, internal analysis helps identify organizational strengths and weaknesses, while external analysis reveals opportunities and threats that may influence long-term objectives or strategic direction. Together, these dimensions create a comprehensive matrix that aids in developing realistic and informed goals.

Table 3. Internal and External Factor in a Typical SWOT Analysis

	Internal Analysis	**External Analysis**
Positive	Strengths (S)	Opportunities (O)
Negative	Weaknesses (W)	Threats (T)

A well-designed SWOT analysis necessitates input from experienced and informed participants to ensure the accuracy and relevance of the insights generated. The effectiveness of such an analysis depends not only on the identification of key internal capabilities and limitations but also on the consideration of dynamic external forces—including macroeconomic trends, regulatory developments, technological shifts, and competitive pressures. Recognizing and properly categorizing these elements is essential, as the strategies formulated in response must be grounded in the actual strategic environment of the organization.

Following the identification of SWOT elements, the decision-making process must include an evaluation of goal feasibility considering the findings. If the analysis reveals that a proposed goal is unrealistic, it should prompt a reassessment and reformulation of objectives. This iterative approach ensures that strategic planning remains responsive, and evidence based. While SWOT analysis is not the sole evaluative method available to organizations, it remains one of the most accessible and adaptable tools across diverse operational contexts. Its major strength lies in its simplicity and flexibility, allowing it to be employed at various decision-making levels. Importantly, no element identified within the SWOT matrix should be prematurely dismissed as insignificant. The true value of any identified factor lies in its ability to contribute to actionable and effective strategies. An element that catalyzes a strong strategic initiative is inherently more important than one that does not translate into practical outcomes.

Nonetheless, SWOT analysis has its own limitations. One key concern is its tendency to become a mere listing exercise, potentially lacking critical prioritization or analytical depth. In the absence of expert input, SWOT matrices may present all factors as equal, creating the false impression that minor opportunities balance out major threats, or that superficial strengths offset structural weaknesses. To mitigate this risk, it is essential to incorporate expert judgment in the evaluation process to establish strategic priorities and guide decision-making in a more structured and coherent manner.

A well-conducted SWOT analysis, regardless of its specific format, typically reveals certain structural patterns. Internal factors generally encompass organizational resources, capabilities, and accumulated experience, whereas external factors relate to broader contextual developments beyond the direct control of management. On the internal side, key considerations include human capital (such as the skills and qualifications of executives and staff), physical infrastructure, financial robustness, environmental certifications and practices, technological structure, and institutional reputation. Collectively, these elements determine how effectively an organization can position its resources in response to strategic challenges.

In examining the external environment, organizations must account for dynamic and often unpredictable events such as demographic changes, economic fluctuations, legislative reforms, and technological advancements. These factors significantly

shape an organization's ability to maintain operational continuity and pursue long-term sustainability. For example, access to a skilled workforce, availability of transport networks, or the regulatory landscape in each region can serve either as facilitators or barriers to strategic execution.

Notably, both internal and external stakeholder perspectives should be integrated into the analysis. While internal teams may focus on operational constraints and strengths, external stakeholders often bring fresh perspectives on emerging risks and opportunities that might remain unnoticed from within. Incorporating this external insight enriches the assessment and supports a more holistic understanding of the organization's strategic positioning within its broader socio-environmental context.

A comprehensive SWOT analysis often identifies four fundamental strategic typologies, each shaped by the interaction between internal capabilities and external conditions. These typologies offer distinct pathways for strategic decision-making, depending on how the organization is positioned in terms of its strengths, weaknesses, opportunities, and threats. The selected configuration can play a pivotal role in shaping long-term planning efforts and enhancing the organization's capacity to remain resilient in the face of changing circumstances.

a. SO Strategy – "Maxi-Maxi" (Leveraging Strengths to Exploit Opportunities): This strategy is employed when a company is favorably positioned both internally and externally. Strong internal capabilities—such as skilled personnel, advanced technology, or solid financial standing—are mobilized to seize promising external opportunities. In the case of MC Co., this could involve utilizing its state-of-the-art dredging capacity to respond to growing demand for sustainable marine infrastructure, thereby coupling operational efficiency with environmental value creation. As a proactive and growth-oriented approach, the SO strategy is often regarded as ideal when the organizational context supports ambitious expansion.

b. WO Strategy – "Mini-Maxi" (Overcoming Weaknesses by Capitalizing on Opportunities): This approach is relevant when a company faces internal shortcomings—such as limited ESG expertise or outdated equipment—yet operates within an situation rich in opportunity. The strategic focus here is on using external advantages (e.g., green innovation subsidies or increasing public support for eco-conscious infrastructure) to address internal gaps. For instance, MC Co. might secure EU sustainability grants to modernize its equipment or train staff in circular economy practices. This pathway is especially relevant for firms transitioning toward more sustainable operational models.

c. ST Strategy – "Maxi-Mini" (Using Strengths to Defend Against Threats): The ST strategy is best suited to scenarios where external threats are significant—such as economic instability or tightening environmental regulations—but the firm possesses strong internal assets. MC Co., equipped with a specialized dredging fleet and a highly skilled workforce, could employ adaptive tactics to manage pressures such as stricter carbon standards or resource scarcity. Though defensive in nature, this strategy remains forward-looking by using internal strengths to reduce vulnerability and maintain operational continuity.

d. WT Strategy – "Mini-Mini" (Minimizing Weaknesses and Mitigating Threats): This configuration represents the most vulnerable position, where internal

limitations are compounded by external challenges. In such cases, a conservative and risk-averse strategy is required. For MC Co., this might involve restructuring its operations, strengthening communication with stakeholders, or adopting cautious financial controls to navigate a highly uncertain landscape. While this approach may appear pessimistic, it is often necessary to prevent further decline and lay the groundwork for future recovery or transformation.

The double materiality approach—now central to the CSRD—emphasizes the dual responsibility of companies to consider both their impact on the environment and society, as well as how sustainability-related issues affect their financial performance. SWOT analysis, by integrating internal (S-W) and external (O-T) factors, aligns naturally with this dual lens. It supports a more nuanced understanding of how internal capabilities and vulnerabilities intersect with external sustainability challenges and opportunities.

ZETA Consulting Company has long recognized the strategic value of integrating SWOT analysis into sustainability practices. Well before the implementation of the CSRD, ZETA had been employing SWOT methodologies in its carbon footprint assessments and sustainability consulting projects. This proactive approach has consistently revealed that a properly conducted SWOT analysis not only aids in identifying critical internal and external factors but also helps to operationalize materiality—particularly in the early planning stages of sustainability initiatives. In retrospect, this methodology has proven to be both forward-thinking and effective in aligning business strategies with evolving sustainability expectations.

In line with this experience, ZETA has consistently emphasized the importance of assessing employee knowledge levels in areas such as climate change, global warming, energy efficiency, and the United Nations' Sustainable Development Goals. These knowledge assessments are embedded within the SWOT process to evaluate not only operational capacity but also the organization’s readiness to adapt to sustainability imperatives. The findings in this study further reinforce the view that employees’ awareness and education on environmental and social issues are not peripheral, but rather central to the company’s ability to generate meaningful sustainability outcomes. Consequently, employee competence is framed not merely as a human resource factor, but as a material aspect under the double materiality principle.

In the context of MC Co., each of these strategic pathways offers practical implications for enhancing sustainability performance under the double materiality framework. The company’s advanced technical capacity and extensive maritime expertise constitute key internal strengths that can be strategically aligned with emerging external opportunities—such as regulatory incentives promoting low-impact coastal infrastructure or the rising public demand for marine biodiversity conservation. In contrast, challenges such as the lack of formal ESG training among personnel or the tightening of climate-related regulations may be viewed as internal weaknesses and external threats, respectively, requiring timely and adaptive responses.

By systematically mapping its operational environment through a structured SWOT analysis, MC Co. not only clarifies its sustainability priorities but also develops actionable strategies that can address both financial resilience and environmental-social responsibility. This integrated application of the SWOT matrix enables the

company to proactively align its operations with stakeholder expectations, comply with evolving regulatory frameworks, and mitigate ecological risks—ultimately strengthening its position in an increasingly sustainability-driven maritime sector.

3 Implementation of the SWOT Analysis at MC Co.

In 2023, as part of its comprehensive sustainability reporting initiative, MC Co. undertook a structured SWOT analysis in collaboration with an independent consulting firm specializing in ESG and sustainability strategy. This effort was aimed at ensuring full alignment with the European Union's Corporate Sustainability Reporting Directive (CSRD), particularly with respect to its foundational principle of double materiality. The decision to incorporate SWOT at the initial phase of the sustainability process was based on the belief that a comprehensive internal-external analysis would provide valuable input for both strategic planning and regulatory alignment.

The implementation of the SWOT analysis took place over two facilitated sessions. A total of 32 participants, including members of the management team, technical staff, and administrative personnel, took part in structured discussions held at both the company's headquarters and its primary logistics and maintenance facility in Tuzla, Istanbul. These 32 individuals represented approximately one-third of MC Co.'s total workforce. Notably, the company's top executives were also present during the sessions, reflecting institutional support for the initiative.

To encourage candid feedback and avoid potential bias, participants were not asked to disclose their names. The sessions were moderated by the project team to maintain consistency and neutrality. The approach favored spontaneity, with participants encouraged to provide the first responses that came to mind in order to capture authentic perceptions of strengths, weaknesses, opportunities, and threats. Although the planned duration for each session was 30 minutes, the discussions extended slightly and were completed within 40 minutes due to the depth of engagement and the richness of insights provided.

Participants were guided through a series of tailored questions aimed at uncovering the company's internal capabilities and vulnerabilities (strengths and weaknesses), as well as external dynamics influencing its operations and sustainability performance (opportunities and threats). The structure of the questions was informed by the dual dimensions of the materiality principle: assessing how sustainability challenges may affect the company financially, and how the company itself may influence broader environmental and societal systems.

The outcomes of these sessions were documented, categorized, and later interpreted within the double materiality framework. Internal strengths were primarily associated with technical capacity, fleet versatility, and project delivery experience, while weaknesses highlighted gaps in employee sustainability training and formal ESG documentation. On the external front, emerging regulations and increasing global demand for low-impact coastal infrastructure were identified as opportunities, where-

as climate-related risks and talent shortages in maritime engineering were considered significant threats.

4 Implementation of the SWOT Analysis at MC Co.

The findings presented in this section offer a comprehensive overview of the SWOT analysis conducted at MC Co., aiming to illuminate the internal and external factors relevant to the company's sustainability trajectory. By structuring the analysis into four distinct components—namely, a classical SWOT assessment, internal evaluations, knowledge-based questions on climate change and sustainability, and open-ended opinion items—this study offers a multilayered perspective on both the organization's strengths and its critical areas for improvement. The breakdown of response rates and the distribution of preferences across the SWOT dimensions highlight notable trends in employee perceptions, particularly concerning the company's perceived advantages and developmental needs. In addition, the analysis incorporates an evaluation of employees' environmental literacy, which contributes to a more nuanced interpretation of MC Co.'s preparedness for aligning with the principles of double materiality.

The first part of the SWOT analysis consisted of 44 conventional questions designed to identify the company's internal strengths and weaknesses, as well as external opportunities and threats. This was followed by 16 questions focusing on internal evaluations, aiming to assess organizational dynamics such as departmental performance and operational alignment with strategic goals. The third segment of the analysis sought to evaluate employees' awareness and knowledge on critical sustainability topics—including climate change, carbon footprint, and global environmental goals—through 13 targeted questions. Finally, the fourth part included nine open-ended questions, designed to gather employees' suggestions and opinions on sustainability-related improvements.

In the data presentation, the abbreviation "B" refers to blank (unanswered) responses, "I" to invalid responses, and "T" to the total number of valid responses. Participation levels across the analysis were notably high. Most questions were answered by 40% to 95% of the participants, and three questions received responses from all 32 individuals. The least answered question still yielded 23 responses, indicating a generally engaged and responsive participant group.

Regarding departmental evaluations, all units received notable recognition, though the finance department was identified as the strongest with 26 positive entries, while the purchasing department received the lowest with 16. In contrast, the most frequently cited weakness pertained to occupational health, safety, and environmental coordination efforts.

The overall distribution of responses is summarized in Table 2. As reflected in the data, internal strengths were cited most frequently, with 31 unique options and a total of 931 responses. Weaknesses followed with 16 distinct categories and 386 responses. Opportunities and threats were represented with 6 and 2 options respectively, accumulating 144 and 94 responses. The most selected item was strength, with 51 men-

tions. Although weaknesses ranked second, opportunities and threats were identified far less frequently, likely due to the inclusion of senior management among participants, whose perspectives may have emphasized internal assets. Nonetheless, weaknesses still constituted 23% of all valid responses, and strengths accounted for more than half (53%).

Table 4. The Breakdown and Distribution of Answers in the SWOT Analysis

Number of Participants in the Analysis				32
Maximum Number of Responses				1,920
Number of Questions Left Blank				194
Number of Invalid Responses				8
Number of Valid Responses				1,445
Distribution of Responses	**S**	**W**	**O**	**T**
Distribution of Answers	**778**	**332**	**241**	**94**
Preferred Options	51	7	0	2

As emphasized earlier, Table 3 presents the results of the 13-item questionnaire designed to assess employees' literacy on sustainability issues, including climate change and carbon footprint. The most significant questions and results are shown in the table. This section revealed a significant number of blank and invalid responses: 96 were left unanswered, and 117 were deemed invalid. Although multiple selections were allowed in some questions, the overall trend showed a lack of knowledge, with many participants incorrectly identifying coal and wood as renewable energy sources. Natural gas, likewise, was frequently—and mistakenly—identified as the most eco-friendly option.

Table 5. Climate Change, Sustainability and Carbon Footprint Questions

1-Do you know enough to explain what the following topics mean? (You can choose more than one option)					
	B	I	Yes	Somewhat	No
Climate change	4	1	25	2	
Ecosystem	4	1	17	9	1
Energy and its transformation	5	1	14	11	1
Pollution	5	-	22	4	1
Waste management and recycling	5	-	17	8	2
Carbon footprint	7	-	10	9	6
Sustainability	5	-	13	12	2
2-Which of these concepts do you think will be the most important in the next twenty years? (Mark the first two concepts as 1 and 2 in order of importance?					
	B	I	Yes	Somewhat	No
Climate change	2	12	8		
Ecosystem	2	12	1		
Energy and its transformation	2	12	11		
Pollution	2	12			
Waste management and recycling	2	12	2		
Carbon footprint	2	12	4		
Sustainability	2	12	5		
3- Please write an example of the first sustainability concept that comes to your mind as a title.					
No answer	Invalid		Correct		
22	6		4		
4-Please mark the renewable energy types below. No answer: 1 Invalid: 4					
Energy Type	Considered as Renewable				
Hydro-thermal	14				
Biomass					
Biodiesel	2				
Organic fuel mix	1				
Natural gas	17				
Coal	7				
Wind	9				
Nuclear	8				
Solar	15				
Geothermal	5				
Wood					
5-In your opinion, what are the three most important renewable energy sources for Türkiye? No Answer: 1 Invalid: 4					
Energy Type	Renewable				
Hydro-thermal	11				
Biomass					
Biodiesel	2				
Organic fuel mix	1				
Natural gas	13				
Coal	6				
Wind	13				

Nuclear	10
Solar	11
Geothermal	6
Wood	2
6-In your opinion, which energy types have the lowest carbon footprint? (Rank from lowest to highest (1 is lowest - 5 is highest) No Answer: 1 Invalid: 9	
Energy Type	Renewable
Hydro-thermal	11
Biomass	5
Biodiesel	4
Organic fuel mix	5
Natural gas	5
Coal	5
Wind	11
Nuclear	7
Solar	14
Geothermal	6
Wood	5
7- If there was an option to provide electricity produced from renewable energy sources for your home or work-place that was slightly more expensive than the normal electricity price, would you use it? No Answer: 4 Invalid: -	
• Yes 14 • No 11 • I am not sure 3	

Evaluation of the Knowledge Levels of the Employees: A review of the responses to the 13-item questionnaire assessing employees' understanding of climate change, sustainability, and carbon footprint concepts reveals a considerable number of blank and invalid responses. Specifically, 96 responses were left blank, while 117 were marked as invalid. Due to the allowance of multiple answers per question, the total response count cannot be precisely determined. Nevertheless, the distribution of answers indicates a significant presence of misconceptions. For instance, a notable portion of participants incorrectly identified coal and wood as renewable energy sources, asserting that they have the lowest carbon footprint. Similarly, natural gas—commonly classified as a non-renewable resource—was selected as the most environmentally friendly energy source by the majority.

Establishing Threshold Values for SWOT Analysis Interpretation: Given that many participants in the SWOT analysis held managerial roles, it is reasonable to observe a tendency toward more cautious identification of external opportunities and threats, while internal strengths and weaknesses were marked with greater clarity. In this regard, the analysis applies differentiated threshold values for each SWOT dimension, reflecting this disparity in response behavior. Based on the highest frequency responses—51 for strengths, 7 for weaknesses, and 2 for threats—corresponding threshold percentages were calculated, as shown in Table 4.

Table 6. Threshold Values for SWOT Analysis Evaluation

SWOT Options	Threshold Value
S (Strengths)	16 (50%)
W (Weaknesses)	8 (50%)
O (Opportunities)	7 or most selected answers
T (Threats)	7 or most selected answers

These threshold values served as the basis for the categorization presented in Table 5, which lists all response items surpassing their respective thresholds. Where multiple items within a single SWOT category exceed the threshold, further elaboration is provided in the accompanying commentary. As indicated, a total of 14 strengths, 6 opportunities, 2 weaknesses, and 2 threats met or exceeded the established thresholds, offering a focused view of material factors derived from the analysis.

Table 7. Strengths, Opportunities, Weaknesses and Threats Preferences and Distribution

S (STRENGTH) – INTERNAL ANALYSIS		
43	Finance department's work	26
59	Do you think there should be a legal affairs unit?	25
60	Should there be dialogue with universities, especially in the fields of education?	25
36	MC CO. Adequacy of marine, bottom dredging, etc. equipment	23
35	MC CO. Adequacy of marine vehicles	22
4	Being a city that ranks first with a share of 64.4% in the total of 2021 domestic information and communication activities	21
19	The railway passing through the borders of Tuzla district and the proximity of the facilities to the nearest train station	21
24	Adequacy of the dialogue between the Chairman of the Board (General Manager) and family members working in the company	21
57	Is the design of the Turkish website complete?	21
1	Working in one of the westernmost districts of Istanbul and a district with a normal population	20
48	Should a research and development directorate/department be established in MC CO.?	20
3	Being a company in a city where the share of the services sector in 2021 domestic per capita national income is 30.3% and the share of the industrial sector is 17.9%	19
5	Being a district of a province where approximately 65% of the Turkish maritime industry is located	19
15	Availability of natural gas in the district	19
25	Adequacy of the General Manager's dialogue with white-collar and blue-collar employees	19
49	Should an environmental and sustainability directorate/department be established in MC CO.?	19
18	The district is located on main highways	18
23	Proximity of Sabiha Gökçen Airport to Tuzla	16
22	Proximity of the nearest marina	16
-	Work of other departments	17
33	Adequacy of MC CO. facilities in terms of infrastructure	16

55	Do you think the current white-collar and blue-collar distinctions are correct?	16
W(WEAKNESS)- INTERNAL ANALYSIS		
45	Do you think the organizational chart is complete?	14
51	Do you think the work safety measures are sufficient?	14
52	Are the internal trainings given to blue-collar workers sufficient?	13
7	In a province where the normal forest area percentage is 44 in 2021 and there is also a province with 20% agricultural area and 5% industrial area	12
30	MC CO. Adequacy of the number of white-collar employees	12
50	Should industrial engineering be established in MC CO.?	12
53	Are the internal trainings given to white-collar workers sufficient	12
26	Lack of assistant general managers	11
31	MC CO. Adequacy of the number of blue-collar employees	11
32	MC CO. Adequacy of the number of female employees	11
46	Are the job descriptions sufficient?	11
34	Adequacy of MC CO. facilities in terms of indoor space	10
55	Are the current white-collar and blue-collar distinctions correct in your opinion?	10
58	Availability of the website in English/foreign languages and is its design complete?	10
12	According to İŞKUR figures, 23.3% of the registered employees as of the end of 2021 were women; however, the rate of female employees at MC CO. is very low;	9
33	Adequacy of the infrastructure of MC CO. facilities	9
42	Works of the OHS-Environment coordination department	9
6	Continental climate, average annual rainfall (764 mm) above the Turkish average (574 mm)	8
29	Adequacy of the distribution of MC CO. services in the domestic market, domestic and international activities	8
21	Not being within the borders of the nearest cruise port and its distance	8
54	Is there a training plan for personal development for white-collar workers other than internal training and is it implemented? Do you think that education level should be considered when distinguishing between white-collar and blue-collar workers?	8
56	Is there a training plan for personal development for white-collar workers other than internal training and is it implemented? Do you think that education level should be considered when distinguishing between white-collar and blue-collar workers?	8
O(OPPORTUNITIES)- EXTERNAL ANALYSIS		
2	Being in a city with a population of around 16 million and ranked 1st in 2021 with 140 thousand 698 TL in domestic per capita income	10
8	Existence and effectiveness of nearly 60 universities, some of which are in Tuzla and its surroundings	13
9	Impact of higher education institutions such as vocational schools and faculties in Tuzla on MC CO. and other industrial establishments	8
10	Compatibility of Vocational and Technical Anatolian High School departments located in Tuzla and surrounding districts with the trained personnel needs of Tuzla and especially MC CO.	10
11	A significant proportion of the district population works in industry	8
13	Proximity to GOSB and other organized industrial zones	12
14	Proximity to Teknopark Istanbul and TÜBİTAK	11
20	Not being within the nearest cargo port	11

16	Not being within the provincial borders of the province	
17	Existence of heavy industry, manufacturing industry and refineries within the borders of the district and in neighboring districts	
20	The nearest cargo port is not within the district	8
T(THREATS) – EXTERNAL ANALYSIS		
6	Continental climate, average annual rainfall (764 mm) above the Turkish average (574 mm)	8
28	Ability of senior management to interpret existing laws and regulations	17
-	The state of the national economy and inflation (added later through discussions)	-

5 Results and Discussion

A comprehensive SWOT analysis was conducted for MC Co., consisting of 79 questions. Of these, 44 questions—along with an additional 16 questions—follow a conventional SWOT structure, while the remaining items aim to evaluate both the status and outlook of the organization. Among these, 16 binary (yes/no) questions were formulated to directly assess internal dynamics. To analyze, affirmative ("yes") responses were interpreted as indicators of strength, while negative ("no") responses were treated as weaknesses. In addition, 14 questions were included to assess participants' environmental awareness and understanding of sustainability-related issues.

Even without applying the previously defined threshold values, the results—summarized in Table 4—indicate that 31 items were identified as strengths, whereas 16 items were classified as weaknesses. These figures suggest that internal strengths are considerably more pronounced than weaknesses. Similarly, six opportunities were highlighted, compared to only three threats. Notably, the third threat was not identified by participants but was added by the consultants due to the ongoing national economic challenges observed in recent months.

The findings strongly reflect a Strength–Opportunity (SO) configuration, which corresponds to the Maxi–Maxi Strategy in SWOT terminology. This suggests that MC Co. is well-positioned to pursue robust growth and strategic development, leveraging both its internal competencies and favorable external conditions.

Nevertheless, for this trajectory of expansion to be sustainable, it is critical that the weaknesses identified in Table 5 are addressed as a matter of priority. Table 6 outlines a proposed order of priority for addressing these internal weaknesses, which should be considered as a strategic action plan for improvement.

On the other hand, the analysis of environmental awareness among employees revealed a significant knowledge gap. The prevalence of incorrect or incomplete responses in this area suggests a limited understanding of environmental and sustainability issues. To remedy this, it is recommended that the company organize a certified environmental training program—ideally lasting two to three days—focusing on key topics such as climate change, carbon footprint reduction, and sustainable business practices. Such an initiative would not only strengthen the company's internal capaci-

ty in line with double materiality principles but also support long-term ESG compliance and stakeholder trust

Table 8. Table captions should be placed above the tables.

Question No.	Weakness Definition	Priority	Recommended Process
45	Do you think the organizational chart is complete?	1	A new organization chart should be prepared, and the job descriptions of the directorates should be prepared
51	Do you think the occupational safety measures are sufficient?	1	A work safety department should be established
52	Are the internal training given to blue-collar workers sufficient?	1	The company should prepare a training program and implement it urgently
7	Being in a province where the normal forest area percentage is 44 in 2021 and in a district where the agricultural area is 20% and the industrial area is 5%	4	There is no action to be taken at the moment. The situation should be re-evaluated as a result of the Izmir investment.
30	Adequacy of the number of MC CO. white-collar employees	3	A new job description should be prepared and the need for white collar workers should be determined
50	Should an industrial engineering department be established in MC CO.?	1	A new organization chart should be prepared, and the job descriptions of the directorates should be prepared
53	Are the internal trainings given to white-collar workers sufficient	2	The company should prepare a training program and implement it urgently
26	Lack of assistant general managers	3	The issue should be discussed in the Board of Directors and a new organization chart should be prepared
31	Adequacy of the number of MC CO. blue-collar employees	1	A new job description should be prepared and the need for blue collar workers should be determined
32	Adequacy of the number of MC CO. female employees	1	The hiring of female employees should be accelerated
46	Are the job descriptions sufficient?	1	New job descriptions should be prepared by consultants
	Adequacy of MC CO. facilities in terms of indoor space	2	The Board of Directors should decide
55	Do you think the current white-collar and blue-collar distinctions are correct?	2	New job descriptions should be prepared by consultants
58	Are the website in English/foreign languages and its design complete?	1	The English website should be prepared by professionals
12	According to İŞKUR figures, 23.3% of the registered employees at the end of 2021 were women; on the other hand, the rate of female	1	The hiring of female employees should be accelerated

	employees in MC CO. was very low;		
33	Adequacy of MC CO. facilities in terms of infrastructure	3	The Board of Directors should decide
42	Works of OHS-Environment coordination department	1	A work safety department should be established
6	Continental climate, average annual rainfall (764 mm) being above the Turkish average (574 mm)	4	There is no action to be taken at the moment. The situation should be re-evaluated as a result of the Izmir investment.
29	Adequacy of distribution of MC CO. services in the local market, domestic and international activities	3	The Board of Directors should decide
21	Not being within the borders of the nearest passenger port and its distance	4	There is no action to be taken at the moment. The situation should be re-evaluated as a result of the Izmir investment.
54	Is there a training plan for personal development for white-collar workers other than internal training and is it implemented?	2	The company should prepare a training program and implement it urgently
56	Do you think that the education level should be considered in distinguishing between white-collar and blue-collar workers?	2	New job descriptions should be prepared by consultants

6 Conclusion

The findings of the SWOT analysis underscore MC Co.'s robust strategic positioning, marked by considerable internal strengths and favorable external opportunities. This alignment suggests that the company is well-equipped to pursue sustainable growth under a Maxi–Maxi strategic posture. Nonetheless, addressing the identified weaknesses—particularly those concerning environmental coordination and awareness—remains crucial for ensuring the organization's long-term resilience. The observed gap in environmental literacy among staff highlights the urgent need for targeted training initiatives and institutional capacity building. Taken together, the findings of this analysis underscore the strategic value of applying SWOT within the framework of double materiality, offering a structured yet adaptable approach for aligning internal strengths with sustainability objectives and evolving stakeholder expectations.

Double materiality represents a significant advancement in how corporate performance is evaluated. It encourages companies to adopt a more comprehensive, transparent, and accountable stance toward sustainability. When used in tandem, SWOT analysis and the double materiality principle provide a practical means of navigating this dual responsibility. By systematically identifying impacts, risks, and opportunities from both financial and societal perspectives, organizations can meet new regulatory requirements, strengthen their brand identity, and cultivate a more resilient and sustainable business model.

Ultimately, the integration of double materiality and SWOT analysis serves as a cornerstone for forward-looking companies striving to generate lasting value—for both them and the broader society. It is important to recognize, however, that the success of such an approach hinges on the presence of an informed and capable workforce. In this regard, the implementation of focused seminars, hands-on training, and applied learning programs can empower employees while simultaneously reinforcing the company's sustainability agenda.

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