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Development and Validation of a Social Marketing Model for Improving the Environmental Performance of Iranian Oil Companies Using an Integrated ISM–SEM–IPA Approach

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ABSTRACT

The present study aimed to design and validate an environmentally friendly social marketing model for oil companies. In terms of purpose, this research was applied, and in terms of methodology, it adopted a mixed-methods (qualitative-quantitative) approach designed based on Saunders' Research Onion model. In the qualitative phase, Interpretive Structural Modeling (ISM) was used to identify and level the influential factors, whereas in the quantitative phase, the validity of the model was examined using Structural Equation Modeling (SEM) and Importance-Performance Map Analysis (IPMA). The statistical population in the qualitative phase consisted of 15 university professors and experts from the oil industry, while the quantitative population comprised 220 experts from the National Iranian Oil Company, from whom 184 usable questionnaires were ultimately collected. Data collection instruments included semi-structured interviews, an ISM questionnaire, and a researcher-developed questionnaire. The findings indicated that the main factors of the model included compliance with environmental requirements throughout all stages of product development, corporate social responsibility, customer and stakeholder satisfaction, government support, potential competitive capacity, managers' commitment to and knowledge of corporate social responsibility, green marketing, green human resource development and management, corporate productivity, efficiency, and profitability, and organizational culture. Furthermore, the final model was classified into four hierarchical levels, with managers' commitment and knowledge and organizational culture identified as fundamental factors, while green marketing, stakeholder satisfaction, and organizational productivity were identified as the ultimate outcomes of the model. The MICMAC analysis also showed that organizational culture and managerial commitment possessed the greatest driving power, whereas stakeholder satisfaction, green marketing, and profitability exhibited the highest dependence. In the validation phase, the findings indicated that the model possessed satisfactory convergent validity, discriminant validity, and reliability, and that the model fit indices were within acceptable ranges. Moreover, the Importance-Performance Map Analysis showed that all major relationships in the model were located in the high-importance/high-performance quadrant, with the relationships associated with environmental requirements and competitive capacity demonstrating the greatest strategic importance. Overall, the findings demonstrate that developing environmentally friendly social marketing in the oil industry requires strengthening organizational culture, managerial commitment, corporate social responsibility, and green marketing strategies in order to achieve sustainable development and competitive advantage.

Keywords: social marketing, green marketing, corporate social responsibility, oil industry, Interpretive Structural Modeling, MICMAC analysis, Structural Equation Modeling.

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Introduction

Environmental degradation, climate change, resource depletion, and the intensification of ecological risks have transformed environmental responsibility from a peripheral concern into a strategic organizational priority. Contemporary firms are increasingly expected not only to comply with environmental regulations but also to integrate sustainability principles into their production systems, marketing practices, stakeholder relationships, human resource policies, and long-term competitive strategies. This pressure is particularly pronounced in industries whose operations exert substantial environmental impacts, including the oil and energy sectors. Oil companies operate within a complex institutional environment in which economic performance, energy security, regulatory compliance, environmental protection, public legitimacy, and stakeholder expectations must be managed simultaneously. Consequently, improving environmental performance in such organizations requires approaches that extend beyond technological upgrades or pollution-control mechanisms and incorporate behavioral, social, managerial, and market-oriented dimensions. Social marketing provides one such perspective because it applies marketing concepts and tools to influence behaviors, attitudes, and social practices in ways that generate benefits for individuals, organizations, communities, and society. Recent research has emphasized the capacity of social marketing to trigger prosocial behaviors by shaping motivations, social norms, perceived value, and behavioral intentions, thereby demonstrating its relevance to sustainability-oriented organizational transformation (1).

Social marketing has progressively evolved from an approach primarily associated with public health campaigns and social causes into a broader managerial framework applicable to sustainable consumption, environmental behavior, organizational responsibility, and stakeholder engagement. Unlike conventional commercial marketing, whose primary objective is often to stimulate demand and maximize economic returns, social marketing seeks to facilitate voluntary behavioral changes that contribute to collective welfare. This distinction has important implications for environmentally sensitive industries because environmental performance depends not only on technical efficiency but also on the behavior of managers, employees, customers, suppliers, regulators, and other stakeholders. Research on sustainable consumer behavior has shown that social marketing can be designed to strengthen environmentally responsible behavioral patterns by integrating social value, trust, persuasive communication, and sustainability considerations into marketing systems (2). Similarly, empirical evidence has demonstrated that social marketing can affect customer purchasing behavior through mechanisms such as customer trust, thereby indicating that socially oriented marketing strategies can influence both behavioral and relational outcomes (3). These findings suggest that social marketing can function as a bridge between organizational objectives and broader environmental and social expectations.

The environmental orientation of social marketing becomes particularly significant when organizations attempt to encourage environmentally responsible behaviors among both internal and external stakeholders. Community-based social marketing, for example, has been proposed as an effective supplemental approach for improving environmental attitudes and environmental health by identifying behavioral barriers, designing locally appropriate interventions, and reinforcing sustainable practices through community engagement (4). Such an approach highlights the importance of behavioral change mechanisms in environmental management and indicates that environmental improvement cannot be achieved solely through formal policies. The effectiveness of sustainability-oriented social marketing also depends on the type of persuasive appeals employed. Research examining fear and guilt appeals has shown that sustainability social marketing messages can influence behavioral intentions, although

their effectiveness depends on how such emotional mechanisms are structured and perceived by target audiences (5). Therefore, organizations require a balanced social marketing system that combines behavioral insight, ethical communication, stakeholder participation, and organizational credibility rather than relying exclusively on promotional messages.

A central dimension of environmentally responsible social marketing is corporate social responsibility. Corporate social responsibility provides the normative and strategic foundation through which organizations acknowledge their economic, legal, ethical, environmental, and social obligations toward stakeholders. In this context, social marketing and corporate social responsibility are mutually reinforcing: corporate social responsibility provides substantive commitments and organizational practices, while social marketing communicates, institutionalizes, and encourages behaviors consistent with those commitments. Studies developing social marketing models based on social responsibility have emphasized the interdisciplinary relationship between marketing and broader social objectives and have demonstrated the importance of embedding social responsibility into marketing structures (6). Similarly, grounded-theory research has proposed social marketing models in which social responsibility and customer attitudes toward the brand operate as central components in shaping organizational relationships with target audiences (7). Related work has further demonstrated the relevance of social responsibility, customer attitudes, and stakeholder-oriented mechanisms in designing context-specific social marketing models (8). These perspectives are especially relevant to oil companies, whose social legitimacy is strongly influenced by their environmental record and their ability to demonstrate responsible conduct to communities, customers, regulators, and other stakeholders.

The stakeholder dimension of social marketing is also important because sustainable organizational performance depends increasingly on long-term relationships rather than isolated market transactions. During periods of crisis and uncertainty, socially responsible marketing has been used by commercial organizations to sustain relationships with consumers and reinforce perceptions of organizational concern and legitimacy (9). Social marketing can therefore contribute to relational outcomes such as satisfaction, trust, identification, and loyalty. For example, research in the banking sector has shown that social marketing can influence customer loyalty through the mediating role of social identity, indicating that socially meaningful organizational actions may strengthen the psychological connection between customers and organizations (10). Research on consumer behavior in other markets has similarly identified relationships between social marketing and behavioral responses, suggesting that social marketing affects not only social attitudes but also consumer decision processes (11). These findings reinforce the need to consider customer and stakeholder satisfaction as an important outcome in environmentally oriented social marketing models.

Communication strategy represents another critical component of social marketing effectiveness. Social marketing interventions must communicate complex social and environmental messages in ways that are credible, engaging, accessible, and behaviorally persuasive. Evidence from the COVID-19 context demonstrated that social marketing communication strategies can play an important role in influencing public responses under conditions requiring coordinated behavioral adaptation (12). At the same time, the rapid expansion of digital technologies has created new opportunities for social marketing communication. Immersive technologies such as 360-degree video and virtual reality have been shown to affect attitudes and helping intentions, illustrating how innovative media can increase emotional engagement and behavioral salience in social marketing campaigns (13). Similarly, the increasing fragmentation of media environments requires organizations to coordinate messages across multiple platforms and interaction points. Research on multichannel and multimedia environments has underscored the

growing importance of understanding consumer behavior across integrated communication channels (14), while studies of marketing in new-media environments demonstrate the need for flexible communication strategies adapted to rapidly changing media consumption patterns (15). For environmentally responsible oil companies, these developments imply that green and social marketing strategies should be supported by coherent, multi-channel communication capable of engaging heterogeneous stakeholder groups.

The omnichannel perspective is particularly relevant because behavior change rarely occurs through a single contact point. Social marketing increasingly requires coordinated interventions that address individuals at different stages of behavioral readiness and through different channels. An omnichannel approach grounded in the Transtheoretical Model of Change has been proposed as a way to strengthen the effectiveness of social marketing by matching messages and interventions to different stages of behavioral transition (16). From an organizational standpoint, this implies that environmental marketing should not be limited to external advertising but should encompass internal communication, employee engagement, stakeholder interaction, service processes, digital platforms, and institutional partnerships. This broader understanding is consistent with research on social marketing in small and medium-sized enterprises, where multiple organizational components and indicators have been identified as necessary for aligning social marketing with economic resilience and organizational sustainability (17). Accordingly, environmentally friendly social marketing should be conceptualized as an integrated organizational capability rather than as a narrow promotional function.

Green marketing constitutes a closely related mechanism through which environmental considerations become embedded in market strategy. Green marketing involves the development, pricing, communication, and delivery of products and services in ways that minimize environmental harm and respond to the environmental concerns of customers and stakeholders. However, green marketing effectiveness depends on consistency between organizational claims and actual environmental practices. When environmental messages are unsupported by organizational behavior, firms may face skepticism and reputational risks; conversely, credible environmental actions can enhance legitimacy, differentiation, and stakeholder trust. Contemporary research has also highlighted the temporal complexity of green marketing, showing that interventions designed to encourage pro-environmental behavior may produce different effects depending on timing, behavioral context, and whether organizations seek to promote or discourage specific forms of consumption (18). This insight is especially important for oil companies because environmentally responsible marketing in the energy sector must reconcile market objectives with resource conservation, demand management, environmental protection, and the broader transition toward sustainable development.

Environmental and social marketing strategies also operate within a broader service and organizational environment that shapes stakeholder perceptions. Physical and organizational environments can affect customers' evaluations of service quality and organizational performance, demonstrating that perceptions are influenced by both direct service interactions and the wider context in which services are delivered (19). In oil companies, this broader environment includes visible environmental practices, workplace culture, employee behavior, safety standards, environmental compliance, technological practices, stakeholder communication, and the organization's relationship with government institutions. These dimensions indicate that environmentally friendly social marketing is inherently systemic. Its effectiveness is likely to depend on relationships among organizational culture, managerial commitment, corporate social responsibility, environmental compliance, human resource practices, competitive capabilities, green marketing, stakeholder satisfaction, government support, and organizational performance.

At the policy level, social marketing is increasingly connected with sustainable development and the achievement of broader societal objectives. Systematic research has shown that social marketing can operate across multiple levels of public policy and contribute to the realization of the Sustainable Development Goals by influencing consumption patterns, social norms, institutional arrangements, and stakeholder behavior (20). This multilevel perspective is especially relevant to strategically important industries such as oil, where corporate decisions interact directly with national development priorities, environmental governance, energy policies, economic resilience, and public welfare. Government support therefore represents more than an external contextual factor; it can shape incentives, regulatory frameworks, access to green technologies, environmental standards, and the feasibility of sustainability-oriented organizational change. In environments characterized by strong state involvement in the energy sector, environmentally responsible social marketing is likely to emerge through interactions among organizational initiatives, regulatory requirements, policy incentives, and stakeholder expectations.

Another essential determinant is green human resource development and management. Environmental strategies ultimately depend on employees and managers who translate organizational policies into operational behavior. Recruitment, training, performance evaluation, empowerment, knowledge management, reward systems, and organizational learning can all be aligned with environmental objectives. From a social marketing perspective, employees are not merely implementers but also internal target audiences whose attitudes and behaviors must be influenced to institutionalize environmental responsibility. The effectiveness of such processes depends heavily on managerial commitment and organizational culture. Managers determine priorities, allocate resources, legitimize environmental initiatives, and establish expectations regarding social and environmental responsibility. Organizational culture, in turn, shapes shared assumptions, values, routines, and norms that influence whether sustainability initiatives become embedded in everyday organizational practices. Without these foundational elements, environmental marketing may remain symbolic rather than operational.

Despite the expanding literature on social marketing, sustainable behavior, corporate social responsibility, stakeholder relations, communication, and green marketing, several conceptual and methodological gaps remain. Much of the existing research examines isolated relationships, such as the effect of social marketing on purchasing behavior, loyalty, behavioral intention, or social attitudes. Fewer studies have developed integrated hierarchical models explaining how foundational organizational factors generate intermediate capabilities and ultimately produce environmental, marketing, stakeholder, and performance outcomes. Furthermore, although existing social marketing research provides useful models for public institutions, consumer markets, small businesses, social causes, and sustainability interventions, sector-specific evidence for environmentally intensive industries remains comparatively limited. The oil industry presents distinctive challenges because of its environmental externalities, regulatory complexity, strategic national importance, capital intensity, stakeholder diversity, and high exposure to public scrutiny. Consequently, models developed in other contexts cannot necessarily be transferred directly to oil companies without contextual validation.

A further methodological issue concerns the need to distinguish between identifying relevant factors and understanding their structural hierarchy, causal influence, statistical validity, and managerial priority. Interpretive Structural Modeling (ISM) is useful for structuring complex systems by identifying relationships among factors and arranging them into hierarchical levels. MICMAC analysis complements ISM by classifying variables according to their driving power and dependence, thereby distinguishing foundational drivers from dependent outcomes and linkage variables. Structural Equation Modeling, particularly Partial Least Squares Structural Equation Modeling

(PLS-SEM), allows the empirical validation of measurement and structural relationships among latent constructs. Importance–Performance Map Analysis (IPMA) extends this analysis by identifying relationships that combine high importance with strong or weak performance, thereby providing practical information for managerial prioritization. Integrating these methods can therefore provide a more comprehensive understanding than any single analytical technique in isolation.

For Iranian oil companies, such an integrated framework is especially valuable because environmental performance is shaped by multiple interdependent organizational and institutional factors. Compliance with environmental requirements throughout product development, corporate social responsibility, stakeholder satisfaction, government support, competitive capacity, managerial commitment and knowledge, green marketing, green human resource development and management, productivity, efficiency and profitability, and organizational culture may not operate independently. Instead, some may constitute foundational drivers, others may function as mediating or enabling mechanisms, and still others may represent organizational outcomes. Identifying this hierarchy can help managers allocate resources more effectively and develop interventions that address the underlying causes of environmental performance rather than focusing only on visible outcomes. Moreover, because social marketing combines behavioral influence with stakeholder value creation, its integration with environmental management may provide a useful mechanism for simultaneously advancing sustainability, legitimacy, competitive advantage, and organizational performance.

Accordingly, the aim of this study is to develop and validate an environmentally friendly social marketing model for improving the environmental performance of Iranian oil companies using an integrated ISM-SEM-IPMA approach.

Methods and Materials

Based on Saunders' (2019) Research Onion model, this study is situated within the pragmatist paradigm because it simultaneously employed qualitative and quantitative data to design and validate an environmentally friendly social marketing model for oil companies. The research adopted a mixed-methods (qualitative-quantitative), exploratory-applied approach. In the qualitative phase, the components and relationships among them were identified through a review of the literature and interviews with experts, whereas in the quantitative phase, the validity of the model was examined.

The research strategy in the qualitative phase was based on Interpretive Structural Modeling (ISM), while the quantitative phase was based on a survey design and Structural Equation Modeling. The statistical population consisted of 15 university professors and oil-industry experts and 220 experts from the National Iranian Oil Company, from whom 184 usable questionnaires were ultimately collected. Snowball sampling was employed for the expert sample.

The data collection instruments included a review of scientific sources, semi-structured interviews, an ISM questionnaire, and a researcher-developed questionnaire. The validation questionnaire included the variables of corporate culture (4 items), compliance with environmental requirements (3 items), potential competitive capacity (3 items), corporate productivity and profitability (3 items), corporate social responsibility (3 items), customer and stakeholder satisfaction (3 items), green human resource management (3 items), green marketing (3 items), government support (3 items), and managers' commitment to and knowledge of social responsibility (3 items).

In the qualitative phase, the validity of the instruments was confirmed through expert judgment and content review. In the quantitative phase, the reliability and validity of the instrument were evaluated using Cronbach's alpha, composite reliability, convergent validity, and discriminant validity. For data analysis, the Structural Self-Interaction Matrix and the final reachability matrix were first constructed, followed by level partitioning of the components. Subsequently, the interpretive structural model was developed, and MICMAC analysis was used to determine the driving power and dependence of the variables. Finally, the validity of the model was examined using Structural Equation Modeling and Importance-Performance Map Analysis (IPMA).

Findings and Results

The demographic information of this study was presented in two sections: "model development" and "model validation." In the model development phase, 15 university professors and experts from the oil industry participated. The results showed that 70% of the respondents were male and 30% were female. Moreover, 80% held doctoral degrees and 20% held master's degrees, with the highest frequency belonging to the 46-50-year age group. In terms of expertise, 53% were theoretical experts and 47% were experiential experts.

In the model validation phase, of the 220 questionnaires distributed among experts of the National Iranian Oil Company, 184 usable questionnaires were collected. The results indicated that 75% of the respondents were male and 25% were female. Furthermore, most participants held master's degrees, and the highest age frequency was observed in the 36-45-year age group. In addition, most respondents had 10-20 years of work experience in the oil industry.

First research question: What are the factors of an environmentally friendly social marketing model in an oil company?

In response to the first research question, a systematic review of the literature was initially conducted, through which 17 factors influencing environmentally friendly social marketing in the oil industry were identified. These factors included compliance with environmental requirements throughout all stages of product development, corporate social responsibility, customer and stakeholder satisfaction, government support, potential competitive capacity, managers' commitment to and knowledge of corporate social responsibility, green marketing, green human resource development and management, corporate productivity, efficiency, and profitability, corporate culture, green technology innovation, green communication and information dissemination, maintenance and enhancement of stakeholder relationships, environmental risk management, development of green markets, support for sustainable development, and legal and ethical responsibility. These factors were extracted from credible scientific sources and relevant studies.

Subsequently, to evaluate and validate the factors, a structured questionnaire was administered to 15 experts in the fields of social marketing and environmental management in the oil industry to assess the importance and influence of each factor. The data collection process was conducted in multiple stages with the aim of achieving expert consensus. The results showed that, of the 17 initial factors, 10 key factors were ultimately confirmed by the experts: compliance with environmental requirements throughout all stages of product development (C1), corporate social responsibility (C2), customer and stakeholder satisfaction (C3), government support (C4), potential competitive capacity (C5), managers' commitment to and knowledge of corporate social responsibility (C6), green marketing (C7), green human resource development and management (C8), corporate productivity, efficiency, and profitability (C9), and corporate culture (C10).

The findings showed that these factors constitute the key dimensions of environmentally friendly social marketing in the oil industry and play an important role in achieving sustainable development, improving environmental performance, increasing stakeholder trust, and enhancing the competitive advantage of oil companies.

Second research question: How are the components of the environmentally friendly social marketing model in an oil company leveled using Interpretive Structural Modeling?

To answer the second research question, after identifying the 10 principal components of the environmentally friendly social marketing model in the oil company, Interpretive Structural Modeling (ISM) was applied. In the first step, a 10 × 10 Structural Self-Interaction Matrix was developed to examine pairwise relationships among the components. In this matrix, the experts specified the influence of the variables on one another using the values 1, −1, 0, and 2, representing direct influence, being influenced, absence of a relationship, and a bidirectional relationship, respectively. The corresponding questionnaire was completed by 15 academic experts, and because of the binary nature of the final matrix, the mode and response frequencies were used to aggregate expert opinions. Finally, by coding the components from C1 to C10 and aggregating the experts' views, the final Structural Self-Interaction Matrix was constructed and used as the basis for level partitioning of the model.

Table 1. Structural Self-Interaction Matrix

Variable	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
Compliance with environmental requirements throughout all stages of product development (C1)	1	2	1	2	1	−1	1	1	1	−1
Corporate social responsibility (C2)	2	1	1	2	1	−1	1	1	1	−1
Customer and stakeholder satisfaction (C3)	−1	−1	1	1	−1	−1	−1	−1	−1	−1
Government support (C4)	2	2	−1	1	−1	−1	1	1	2	−1
Potential competitive capacity (C5)	−1	−1	1	1	1	−1	−1	−1	−1	−1
Managers' commitment to and knowledge of corporate social responsibility (C6)	1	1	1	1	1	1	1	1	1	2
Green marketing (C7)	−1	−1	1	−1	1	−1	1	−1	1	−1
Green human resource development and management (C8)	−1	−1	1	−1	1	−1	1	1	1	−1
Corporate productivity, efficiency, and profitability (C9)	−1	−1	1	2	1	−1	−1	−1	1	−1
Corporate culture (C10)	1	1	1	1	1	2	1	1	1	1

Step 2: Formation of the Initial Reachability Matrix

At this stage, based on the aforementioned procedure, the Structural Self-Interaction Matrix (SSIM) was converted into the initial reachability matrix. This conversion was performed to specify the direct and indirect relationships among the variables.

The results of this stage, which represent the initial relationships among the variables, are presented in Table 2 under the title "Initial Reachability Matrix." This matrix provides the basis for the subsequent stages of structural analysis and determination of the hierarchical levels of the variables in the Interpretive Structural Model.

Table 2. Initial Reachability Matrix

Variable	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
C1	0	1	1	1	0	1	1	1	1	1
C2	0	1	1	1	0	1	1	1	1	1
C3	0	0	0	0	0	0	1	1	0	0
C4	0	1	1	1	0	0	1	0	1	1
C5	0	0	0	0	0	1	1	1	0	0
C6	1	1	1	1	1	1	1	1	1	1
C7	0	1	0	1	0	1	0	1	0	0
C8	0	1	1	1	0	1	0	1	0	0
C9	0	1	0	0	0	1	1	1	0	0
C10	1	1	1	1	1	1	1	1	1	1

After preparing the initial reachability matrix, the final reachability matrix was developed to overcome limitations such as the failure to represent the effect of a variable on itself and indirect relationships among variables. For example, if variable A influences B and B influences C, the relationship between A and C is also incorporated into the final matrix. In Table 3, the highlighted cells in the original analysis indicate the modifications made relative to the initial matrix. This matrix, which was developed by aggregating expert opinions and is represented as a binary zero-one matrix, constitutes the basis of the Interpretive Structural Modeling analysis. The results indicate that managers' commitment to and knowledge of corporate social responsibility and corporate culture possess the greatest driving power, whereas customer and stakeholder satisfaction, government support, green marketing, and corporate productivity and profitability exhibit the greatest dependence and are positioned at the lower level of the model.

Table 3. Final Reachability Matrix

Variable	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	Driving Power
C1	1	1	1	1	1	0	1	1	1	0	8
C2	1	1	1	1	1	0	1	1	1	0	8
C3	1	1	1	1	0	0	1	1	1	0	7
C4	1	1	1	1	1	0	1	1	1	0	8
C5	1	1	1	1	1	0	1	1	1	0	8
C6	1	1	1	1	1	1	1	1	1	1	10
C7	0	0	1	1	1	0	1	0	1	0	5
C8	0	0	1	1	1	0	1	1	1	0	6
C9	1	1	1	1	1	0	1	1	1	0	8
C10	1	1	1	1	1	1	1	1	1	1	10
Dependence	8	8	10	10	9	2	10	9	10	2	

Step 3: Relationships and Level Partitioning of the Variables

After developing the final reachability matrix, the variables were partitioned into levels to determine their degree of influence and dependence. At this stage, the variables were classified on the basis of their antecedent and reachability sets; the antecedent variables represent the factors affecting a particular variable, whereas the reachability variables indicate the variables influenced by it. Subsequently, by examining the intersection of the antecedent and reachability sets, variables whose reachability sets were equal to their intersection sets were placed at the first level. After each level was determined, the corresponding rows and columns were removed from the matrix, and this process continued until all variables were partitioned into levels. The results indicate the hierarchical structure and causal relationships among the variables.

Table 4. Level Partitioning of the Variables

Variable	Reachability Set	Antecedent Set	Intersection Set	Level
Customer and stakeholder satisfaction (C3)	C1, C2, C3, C4, C7, C8, C9	C1, C2, C3, C4, C5, C6, C7, C8, C9, C10	C1, C2, C3, C4, C7, C8, C9	Exit > Level 1
Government support (C4)	C1, C2, C3, C4, C5, C7, C8, C9	C1, C2, C3, C4, C5, C6, C7, C8, C9, C10	C1, C2, C3, C4, C5, C7, C8, C9	Exit > Level 1
Green marketing (C7)	C3, C4, C5, C7, C9	C1, C2, C3, C4, C5, C6, C7, C8, C9, C10	C3, C4, C5, C7, C9	Exit > Level 1
Corporate productivity, efficiency, and profitability (C9)	C1, C2, C3, C4, C5, C7, C8, C9	C1, C2, C3, C4, C5, C6, C7, C8, C9, C10	C1, C2, C3, C4, C5, C7, C8, C9	Exit > Level 1
Potential competitive capacity (C5)	C1, C2, C5, C8	C1, C2, C5, C6, C8, C10	C1, C2, C5, C8	Exit > Level 2
Green human resource development and management (C8)	C5, C8	C1, C2, C5, C6, C8, C10	C5, C8	Exit > Level 2

Compliance with environmental requirements throughout all stages of product development (C1)	C1, C2	C1, C2, C6, C10	C1, C2	Exit > Level 3
Corporate social responsibility (C2)	C1, C2	C1, C2, C6, C10	C1, C2	Exit > Level 3
Managers' commitment to and knowledge of corporate social responsibility (C6)	C6, C10	C6, C10	C6, C10	Exit > Level 4
Corporate culture (C10)	C6, C10	C6, C10	C6, C10	Exit > Level 4

The findings indicated that managers' commitment to and knowledge of corporate social responsibility and corporate culture were located at the fourth level of the environmentally friendly social marketing model for the oil company. In addition, compliance with environmental requirements throughout all stages of product development and corporate social responsibility were classified at the third level of the model. Furthermore, green human resource development and management and potential competitive capacity were positioned at the second level. Finally, corporate productivity, efficiency, and profitability, green marketing, government support, and customer and stakeholder satisfaction were identified as first-level variables in the environmentally friendly social marketing model for the oil company.

Step 4: Development of the Interpretive Structural Model and Interaction Network

In the fourth step, the Interpretive Structural Model of environmentally friendly social marketing in the oil company was developed. The results indicated that the research variables were distributed across four hierarchical levels and that the causal relationships among them could be systematically explained. At the fourth level, "managers' commitment to and knowledge of corporate social responsibility" and "corporate culture" were identified as fundamental factors. At the third level, "compliance with environmental requirements during the stages of product development" and "corporate social responsibility" were positioned as intermediary factors. Furthermore, "green human resource development and management" and "potential competitive capacity" were identified as enabling factors at the second level. Finally, "corporate productivity, efficiency, and profitability," "green marketing," "government support," and "customer and stakeholder satisfaction" were positioned at the first level as the ultimate outcomes of the model. Overall, the model demonstrates that the fundamental factors facilitate the achievement of green marketing and sustainable development objectives by strengthening managerial and organizational foundations.

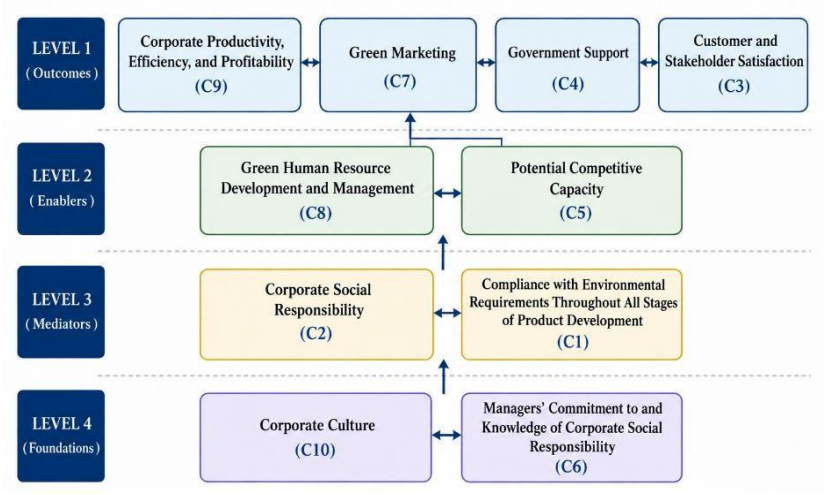

Figure 1. Final Interpretive Structural Model

Final Step: Driving Power–Dependence Analysis

In the final step, Driving Power-Dependence Analysis (MICMAC) was used to complete the analysis of the Interpretive Structural Model and determine the degree to which the model variables influence and are influenced by other variables. The results indicated that managers' commitment to and knowledge of corporate social responsibility and corporate culture were located in the fundamental or independent quadrant and were identified as key factors characterized by high driving power and low dependence. In contrast, customer and stakeholder satisfaction, government support, green marketing, and corporate productivity, efficiency, and profitability were located in the dependent quadrant and were the variables most strongly influenced by other factors. Furthermore, compliance with environmental requirements, corporate social responsibility, potential competitive capacity, and green human resource development and management were positioned in the intermediate region and exhibited moderate levels of both driving power and dependence. Overall, the results indicate that the success of environmentally friendly social marketing in the oil company depends primarily on strengthening organizational culture and managerial commitment.

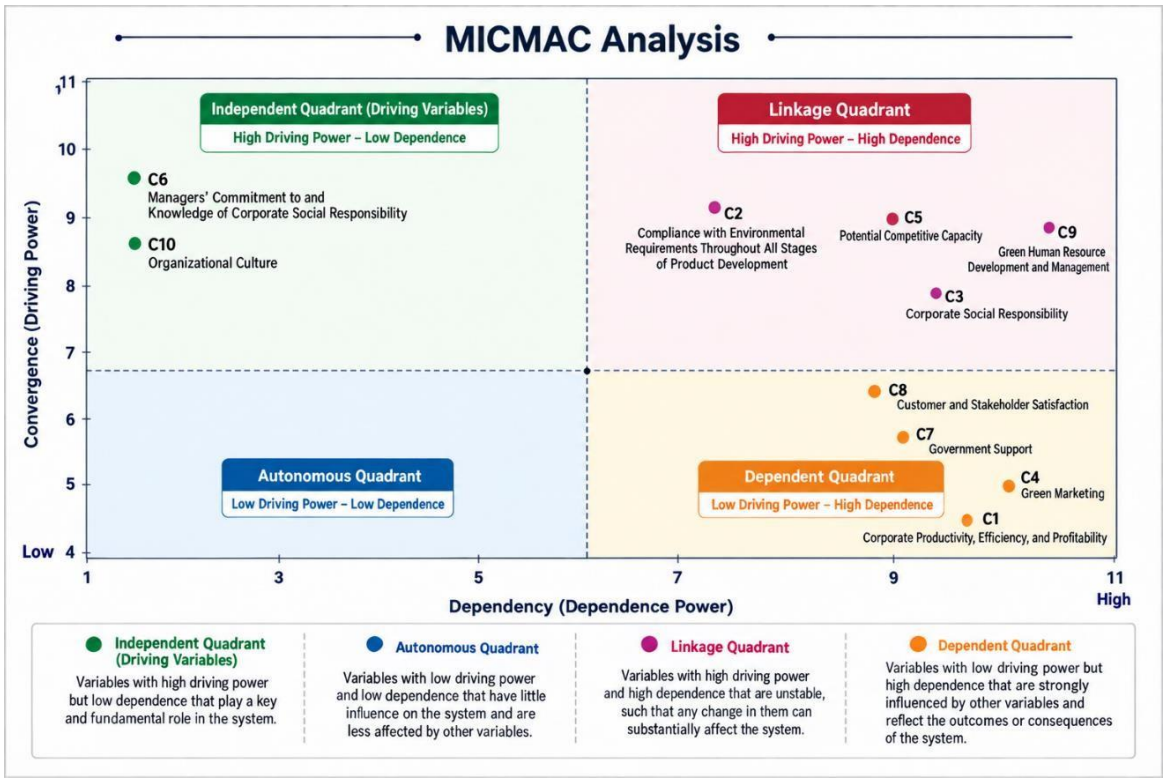

Figure 2. MICMAC Analytical Diagram

Third research question: What is the validity of the environmentally friendly social marketing model in the oil company?

To assess the validity of the environmentally friendly social marketing model in the oil company, Structural Equation Modeling using the Partial Least Squares approach (PLS-SEM) was employed. This method was selected because of the exploratory nature of the study, the complexity of the model, and the limitations associated with the sample size, and it enabled simultaneous evaluation of the measurement model and the structural model. In the measurement model assessment, convergent validity and discriminant validity were examined. The results indicated that the Average Variance Extracted (AVE) for all constructs exceeded 0.50; therefore, the convergent validity of the model was confirmed, and the items associated with each construct demonstrated appropriate

correlations and internal consistency. Furthermore, the Fornell-Larcker criterion was used to assess discriminant validity. According to the results, the square root of the AVE for each construct was greater than its correlation coefficients with the other constructs; consequently, the conceptual distinctiveness and independence of the constructs were confirmed. The findings indicate that the research model possesses satisfactory validity and fit and that the relationships among the variables of the environmentally friendly social marketing model in the oil company demonstrate appropriate explanatory power and reliability.

Table 5. Fornell–Larcker Criterion

Construct	CC	CERSPD	COPO	CPEP	CSR	CSS	GHRD	GMR	GSB	MCKCSR
CC	0.729									
CERSPD	0.600	0.849								
COPO	0.590	0.593	0.839							
CPEP	0.643	0.572	0.540	0.770						
CSR	0.634	0.639	0.583	0.600	0.736					
CSS	0.664	0.554	0.521	0.518	0.554	0.807				
GHRD	0.529	0.572	0.590	0.547	0.629	0.693	0.802			
GMR	0.530	0.579	0.517	0.534	0.637	0.534	0.518	0.790		
GSB	0.634	0.513	0.579	0.616	0.543	0.686	0.641	0.653	0.720	
MCKCSR	0.550	0.596	0.643	0.636	0.615	0.515	0.569	0.545	0.510	0.851

The assessment of discriminant validity indicated that the square roots of the Average Variance Extracted for all constructs were greater than the inter-construct correlation coefficients; therefore, the constructs demonstrated appropriate conceptual distinctiveness and no meaningful conceptual overlap was observed among them.

In the cross-loading method, the factor loading of each item on its corresponding construct is compared with the loading of the same item on the other constructs. The results indicated that the factor loading of each item on its primary construct was greater than its loadings on the other constructs; therefore, the items appropriately measured their intended constructs, and no meaningful conceptual overlap existed among the constructs. Accordingly, the discriminant validity of the model was confirmed based on the cross-loading method.

Table 6. Cross-Loading Matrix

Item	CC	CERSPD	COPO	CPEP	CSR	CSS	GHRD	GMR	GSB	MCKCSR
CC1	0.790	0.619	0.606	0.564	0.534	0.624	0.587	0.583	0.499	0.581
CC2	0.746	0.633	0.643	0.597	0.497	0.572	0.530	0.604	0.429	0.575
CC3	0.613	0.468	0.477	0.458	0.329	0.381	0.454	0.392	0.372	0.427
CC4	0.756	0.597	0.565	0.538	0.462	0.620	0.547	0.525	0.540	0.590
CERSPD1	0.645	0.885	0.626	0.698	0.606	0.699	0.756	0.743	0.643	0.538
CERSPD2	0.646	0.834	0.638	0.609	0.500	0.602	0.623	0.578	0.577	0.630
CERSPD3	0.640	0.829	0.651	0.658	0.514	0.615	0.575	0.655	0.594	0.654
COPO1	0.697	0.621	0.890	0.654	0.515	0.697	0.641	0.705	0.661	0.600
COPO2	0.564	0.623	0.798	0.587	0.459	0.645	0.545	0.553	0.574	0.626
COPO3	0.626	0.648	0.828	0.621	0.494	0.641	0.614	0.627	0.528	0.653
CPEP1	0.593	0.665	0.590	0.789	0.543	0.599	0.630	0.580	0.498	0.605
CPEP2	0.569	0.600	0.578	0.757	0.348	0.564	0.506	0.569	0.463	0.514
CPEP3	0.554	0.513	0.542	0.765	0.488	0.491	0.533	0.547	0.461	0.499
CSR1	0.380	0.343	0.261	0.302	0.752	0.244	0.319	0.325	0.289	0.315
CSR2	0.493	0.524	0.491	0.466	0.780	0.468	0.551	0.543	0.442	0.507
CSR3	0.509	0.512	0.487	0.521	0.769	0.463	0.478	0.499	0.439	0.499
CSS1	0.625	0.655	0.623	0.602	0.457	0.843	0.572	0.617	0.570	0.631
CSS2	0.607	0.597	0.592	0.603	0.431	0.792	0.543	0.580	0.552	0.621
CSS3	0.620	0.569	0.579	0.532	0.454	0.784	0.564	0.578	0.538	0.636
GHRD1	0.561	0.606	0.602	0.588	0.459	0.556	0.819	0.630	0.533	0.608
GHRD2	0.573	0.614	0.549	0.566	0.467	0.532	0.793	0.565	0.488	0.628

GHRD3	0.619	0.639	0.571	0.592	0.585	0.580	0.795	0.613	0.520	0.616
GMR1	0.591	0.597	0.582	0.595	0.469	0.598	0.608	0.797	0.522	0.605
GMR2	0.611	0.680	0.668	0.612	0.508	0.603	0.614	0.792	0.550	0.612
GMR3	0.521	0.560	0.519	0.526	0.536	0.532	0.555	0.781	0.470	0.542
GSB1	0.631	0.678	0.651	0.581	0.525	0.609	0.625	0.621	0.873	0.660
GSB2	0.378	0.467	0.459	0.384	0.354	0.461	0.415	0.425	0.700	0.443
GSB3	0.284	0.327	0.357	0.319	0.232	0.381	0.266	0.304	0.749	0.384
MCKCSR1	0.660	0.709	0.662	0.628	0.524	0.651	0.659	0.622	0.645	0.870
MCKCSR2	0.594	0.654	0.650	0.544	0.508	0.644	0.582	0.622	0.610	0.821
MCKCSR3	0.660	0.667	0.696	0.618	0.538	0.692	0.618	0.656	0.556	0.860

The assessment of model reliability indicated that Cronbach's alpha values for the constructs were reported at acceptable levels; therefore, the items associated with each construct demonstrated satisfactory internal consistency and reliability. Furthermore, composite reliability values demonstrated satisfactory stability and consistency of the items in measuring their respective constructs. In addition, the factor-loading results showed that all indicators had factor loadings greater than 0.40; consequently, the indicators loaded appropriately on their corresponding constructs and demonstrated satisfactory validity and reliability.

Table 7. Average Variance Extracted and Reliability Indices

Variable	Abbreviation	Average Variance Extracted	Cronbach's Alpha	Composite Reliability	R^2
Corporate culture	CC	0.532	0.706	0.720	—
Compliance with environmental requirements throughout all stages of product development	CERSPD	0.722	0.807	0.816	0.728
Potential competitive capacity	COPO	0.705	0.789	0.796	0.638
Corporate productivity, efficiency, and profitability	CPEP	0.594	0.658	0.661	0.626
Corporate social responsibility	CSR	0.541	0.586	0.603	0.446
Customer and stakeholder satisfaction	CSS	0.651	0.732	0.739	0.655
Green human resource development and management	GHRD	0.644	0.723	0.724	0.627
Green marketing	GMR	0.624	0.700	0.703	0.659
Government support	GSB	0.518	0.531	0.747	0.532
Managers' commitment to and knowledge of corporate social responsibility	MCKCSR	0.723	0.809	0.720	—

To evaluate the structural model of the study, standardized path coefficients and the coefficient of determination were employed within the framework of Partial Least Squares Structural Equation Modeling. The results indicated that all standardized path coefficients were positive and statistically significant, demonstrating direct and consistent relationships among the latent variables of the model and confirming the logical coherence of the conceptual relationships in the study. The standardized path coefficients are presented in the structural model figure.

Furthermore, the coefficient of determination was used to assess the explanatory power of the model. The results showed that the coefficient of determination for all endogenous variables exceeded 0.40, indicating satisfactory explanatory power of the structural model and the strong ability of the exogenous variables to explain the variance in the dependent variables. The coefficients of determination are reported in Table 7.

The structural model analysis indicated that all relationships among the variables of the environmentally friendly social marketing model in the oil company were positive and statistically significant and that the research model possessed satisfactory statistical robustness. The findings demonstrated that corporate culture had a positive and statistically significant effect on compliance with environmental requirements throughout all stages of product development ($\beta = 0.464$, $t = 8.631$, $p < .001$) and corporate social responsibility ($\beta = 0.394$, $t = 5.162$, $p < .001$),

indicating the fundamental role of organizational culture in strengthening environmental and social responsibility. Furthermore, managers' commitment to and knowledge of corporate social responsibility, as a fundamental factor, had positive and statistically significant effects on compliance with environmental requirements (β = 0.448, t = 8.574, p < .001) and corporate social responsibility (β = 0.320, t = 4.292, p < .001), confirming the importance of managers in directing sustainability-oriented strategies.

The results further showed that compliance with environmental requirements had a very strong effect on potential competitive capacity (β = 0.710, t = 15.550, p < .001) and green human resource development and management (β = 0.626, t = 12.473, p < .001), indicating the key role of adherence to environmental principles in enhancing competitive advantage and developing sustainable human capital. In addition, corporate social responsibility had positive and statistically significant effects on potential competitive capacity (β = 0.130, t = 2.259, p = .024) and green human resource development and management (β = 0.229, t = 3.776, p < .001).

Furthermore, the mediating variables, including potential competitive capacity and green human resource development and management, played an important role in improving organizational performance. Potential competitive capacity had positive and statistically significant effects on corporate productivity, efficiency, and profitability (β = 0.453, t = 7.836, p < .001), customer and stakeholder satisfaction (β = 0.597, t = 10.195, p < .001), green marketing (β = 0.438, t = 6.897, p < .001), and government support (β = 0.500, t = 7.811, p < .001). Similarly, green human resource development and management had positive and statistically significant effects on corporate productivity, efficiency, and profitability (β = 0.401, t = 6.893, p < .001), customer and stakeholder satisfaction (β = 0.266, t = 4.348, p < .001), green marketing (β = 0.438, t = 6.647, p < .001), and government support (β = 0.282, t = 4.040, p < .001).

Overall, the findings indicate that organizational culture and managerial commitment, as fundamental factors, facilitate the realization of green marketing, increased productivity, government support, and stakeholder satisfaction by strengthening corporate social responsibility, compliance with environmental requirements, green human resource development, and competitive capacity. These findings suggest that attention to corporate social responsibility and environmental requirements in the oil industry is not merely an ethical and legal obligation but also an effective strategy for achieving sustainable competitive advantage and improving overall organizational performance.

Table 8. Results of Structural Model Path Analysis

Path	β	Mean	*t* Statistic	*p* Value
CC → CERSPD	0.464	0.464	8.631	< .001
CC → CSR	0.394	0.394	5.162	< .001
CERSPD → COPO	0.710	0.710	15.550	< .001
CERSPD → GHRD	0.626	0.626	12.473	< .001
COPO → CPEP	0.453	0.453	7.836	< .001
COPO → CSS	0.597	0.597	10.195	< .001
COPO → GMR	0.438	0.438	6.897	< .001
COPO → GSB	0.500	0.500	7.811	< .001
CSR → COPO	0.130	0.130	2.259	.024
CSR → GHRD	0.229	0.229	3.776	< .001
GHRD → CPEP	0.401	0.401	6.893	< .001
GHRD → CSS	0.266	0.266	4.348	< .001
GHRD → GMR	0.438	0.438	6.647	< .001
GHRD → GSB	0.282	0.282	4.040	< .001
MCKCSR → CERSPD	0.448	0.448	8.574	< .001
MCKCSR → CSR	0.320	0.320	4.292	< .001

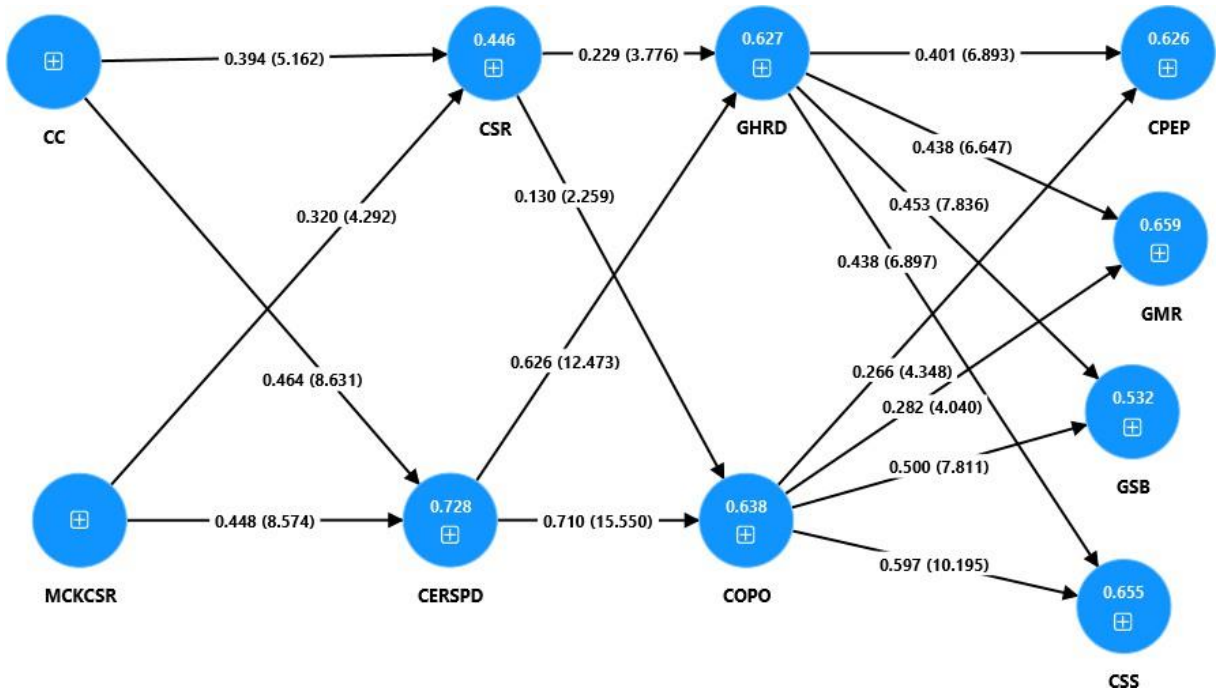

Figure 3. Standardized Path Coefficients and *t* Statistics

Fourth research question: Based on Importance–Performance Map Analysis (IPMA), which paths and relationships in the environmentally friendly social marketing model in the oil company demonstrate the greatest importance and performance?

To answer the fourth research question, Importance-Performance Map Analysis (IPMA) was employed to determine the importance and performance levels of the model variables. The results presented in Table 9 indicated that the performance threshold was 0.3657 and the importance threshold was 0.3933, and that all 11 principal paths of the model were located in the "high importance/high performance" (HI/HP) quadrant. This finding indicates that all identified relationships demonstrate satisfactory levels of both importance and performance.

Furthermore, the CERSPD → COPO and CERSPD → GHRD paths, with values of 0.710 and 0.626, respectively, demonstrated the greatest importance and performance and were identified as the most important drivers of the model. The findings also indicated that none of the paths were located in the "high importance/low performance" quadrant; therefore, the organization demonstrated balanced and effective performance in implementing the key strategies of the model, and maintaining and strengthening this situation is essential.

Table 9. Results of Path Analysis and Importance–Performance Map Analysis (IPMA)

Relationship	Importance	Performance	Importance ≥ 0.3933	Performance ≥ 0.3657	Matrix Quadrant
CC → CERSPD	0.464	0.464	Yes	Yes	HI/HP
CC → CSR	0.394	0.394	Yes	Yes	HI/HP
CERSPD → COPO	0.710	0.710	Yes	Yes	HI/HP
CERSPD → GHRD	0.626	0.626	Yes	Yes	HI/HP
COPO → CPEP	0.453	0.453	Yes	Yes	HI/HP
COPO → CSS	0.597	0.597	Yes	Yes	HI/HP
COPO → GMR	0.438	0.438	Yes	Yes	HI/HP
COPO → GSB	0.500	0.500	Yes	Yes	HI/HP
GHRD → CPEP	0.130	0.130	Yes	Yes	HI/HP
GHRD → GMR	0.229	0.229	Yes	Yes	HI/HP
MCKCSR → CERSPD	0.401	0.401	Yes	Yes	HI/HP

Discussion and Conclusion

The present study developed and validated an environmentally friendly social marketing model for improving the environmental performance of Iranian oil companies using an integrated ISM-SEM-IPMA approach. The findings showed that the model is structured around ten key factors: compliance with environmental requirements throughout all stages of product development, corporate social responsibility, customer and stakeholder satisfaction, government support, potential competitive capacity, managers' commitment to and knowledge of corporate social responsibility, green marketing, green human resource development and management, corporate productivity, efficiency, and profitability, and corporate culture. The interpretive structural analysis placed these factors into four hierarchical levels. Managers' commitment to and knowledge of corporate social responsibility and corporate culture were located at the foundational level; compliance with environmental requirements and corporate social responsibility were positioned as mediating factors; green human resource development and management and potential competitive capacity were identified as enabling factors; and corporate productivity, efficiency, and profitability, green marketing, government support, and customer and stakeholder satisfaction emerged as outcome variables. The MICMAC analysis further confirmed the influential position of managerial commitment and organizational culture, while the structural model demonstrated statistically significant relationships among the main constructs. Finally, the IPMA results indicated that the principal relationships of the model were concentrated in the high-importance/high-performance region, with the paths from environmental compliance to competitive capacity and green human resource development showing particularly strong importance.

The placement of corporate culture and managers' commitment and knowledge at the foundational level is theoretically meaningful because environmentally responsible social marketing requires a supportive internal context before it can influence external stakeholders or generate market outcomes. Organizational culture determines the shared values, norms, and assumptions through which environmental responsibility is interpreted and translated into routine action. Similarly, managerial commitment provides the strategic direction and resource allocation required for sustainability initiatives to become embedded in organizational practice. The significant positive effects of corporate culture on environmental compliance and corporate social responsibility in the structural model reinforce this conclusion. These findings are consistent with the broader social marketing literature, which emphasizes that successful social marketing depends not only on communication with target audiences but also on the organizational capacity to sustain socially responsible behavior (1). They are also aligned with studies showing that social marketing models become more effective when they are supported by social responsibility and organizational mechanisms that enhance trust, positive attitudes, and behavioral commitment (7, 8). In this respect, the present results suggest that in the oil industry, social marketing should be understood as an organizational philosophy rather than merely a promotional technique.

The significant effect of managerial commitment and knowledge on both environmental compliance and corporate social responsibility further highlights the importance of leadership in shaping sustainability-oriented behavior. Managers influence whether environmental standards are treated as strategic priorities, compliance obligations, or peripheral concerns. Their knowledge of corporate social responsibility also affects their ability to integrate environmental, social, and economic objectives. This finding is consistent with previous research demonstrating that social marketing can support sustainable consumer behavior when organizational strategies are deliberately designed around sustainability and responsibility principles (2). It also corresponds with evidence that

social marketing can influence purchasing behavior through trust, implying that stakeholders respond more favorably when organizational messages are supported by credible managerial and institutional conduct (3). Therefore, managerial commitment can be interpreted as a credibility mechanism that reduces the gap between sustainability communication and actual organizational practice.

The positioning of environmental compliance and corporate social responsibility at the third level of the hierarchy indicates that these variables act as critical mediators between foundational organizational conditions and higher-level performance outcomes. In other words, organizational culture and managerial commitment appear to exert their effects partly through the institutionalization of environmental responsibility and socially responsible conduct. This result is consistent with studies emphasizing the close relationship between social marketing and corporate social responsibility. Social responsibility-based social marketing models have been proposed as interdisciplinary frameworks capable of aligning organizational goals with social welfare and stakeholder expectations (6). Similarly, research on social marketing with the role of social responsibility has emphasized the importance of linking responsible organizational behavior with customer attitudes and brand perceptions (7). The current study extends this logic to the oil industry by showing that environmental compliance and corporate social responsibility are not merely final outcomes of ethical management; rather, they operate as intermediate mechanisms through which internal organizational conditions are translated into competitive and market-oriented consequences.

The positive and strong effect of compliance with environmental requirements on potential competitive capacity is one of the most important findings of the study. This result suggests that environmental compliance should not be regarded solely as a regulatory cost. Instead, adherence to environmental principles can strengthen competitive capabilities by enhancing legitimacy, reducing environmental risk, improving stakeholder confidence, stimulating process innovation, and differentiating the organization. This interpretation is compatible with contemporary views of green marketing, which frame environmental responsibility as a strategic resource that may create reputational and competitive benefits when it is credible and integrated into organizational practice. Research on pro-environmental behavior has demonstrated that green marketing strategies can influence behavior when they are appropriately aligned with contextual and temporal conditions (18). In addition, multilevel approaches to social marketing have shown that sustainability-related behavior is shaped by organizational, policy, and societal mechanisms simultaneously (20). The present findings therefore indicate that environmental compliance can function as a competitive resource when it is embedded within a broader social marketing and sustainability framework.

Environmental compliance also had a substantial positive effect on green human resource development and management. This relationship implies that organizations committed to environmental standards are more likely to institutionalize sustainability through recruitment, training, evaluation, empowerment, and employee development systems. Employees constitute an essential internal audience for social marketing because environmental goals cannot be implemented effectively without behavioral change within the organization. Community-based social marketing research has shown that environmentally responsible behavior is more likely to emerge when interventions are designed around contextual barriers, attitudes, and behavioral facilitators (4). Although that research focuses on community settings, the same principle applies within organizations: environmental policies become effective when they are translated into concrete behavioral expectations and supported by learning and reinforcement mechanisms. The present findings suggest that green human resource management performs this internal social marketing function by embedding environmental responsibility into human capital practices.

Corporate social responsibility also exerted significant positive effects on potential competitive capacity and green human resource development and management. These relationships reinforce the view that social responsibility can generate both external and internal organizational benefits. Externally, socially responsible behavior can strengthen legitimacy, customer trust, and stakeholder relationships; internally, it can influence employee attitudes, identity, and organizational commitment. Research has shown that social marketing can reinforce customer loyalty through social identity (10), while other studies indicate that social marketing can affect consumer behavior and purchasing responses (11). Commercial organizations have also used social marketing to maintain sustainable relationships with consumers during periods of disruption and uncertainty (9). These studies support the present finding that corporate social responsibility can contribute to competitive capacity by creating stronger relational resources and can also support green human resource development by increasing the social meaning and legitimacy of environmental practices within the organization.

The mediating role of potential competitive capacity in predicting corporate productivity, efficiency, and profitability, customer and stakeholder satisfaction, green marketing, and government support is another important contribution of the study. Competitive capacity appears to operate as a central organizational mechanism through which environmental and social responsibility can be converted into tangible organizational outcomes. A company with stronger competitive capacity is more likely to allocate resources effectively, adapt to changing environmental expectations, differentiate itself in the market, and engage stakeholders more successfully. The significant effect on customer and stakeholder satisfaction is especially consistent with research showing that socially responsible and sustainability-oriented marketing can influence attitudes, trust, loyalty, and behavioral responses (3, 10). It also accords with evidence from service settings demonstrating that the environment in which services are delivered can influence customers' perceptions of service quality (19). Although the context differs, the underlying implication is similar: customers and stakeholders evaluate organizations based not only on core outputs but also on the broader social, environmental, and institutional environment created by the organization.

The positive relationship between competitive capacity and green marketing also suggests that green marketing is more effective when supported by genuine organizational capabilities. This is particularly important because green marketing may lose credibility when environmental claims are disconnected from actual organizational performance. The present findings indicate that environmental compliance and competitive capacity precede green marketing in the structural hierarchy, implying that credible green marketing should emerge from substantive environmental capabilities rather than symbolic communication. This interpretation is supported by research showing that social marketing effectiveness depends on meaningful behavioral and contextual alignment rather than message exposure alone (1). It is also consistent with findings that social marketing communication must be strategically designed to influence behavior under complex conditions (12). Furthermore, contemporary communication research indicates that organizations increasingly need to integrate multiple channels and media formats to strengthen engagement (14, 15). Therefore, the current results support a model in which green marketing is rooted in organizational competence and then communicated through appropriate stakeholder channels.

Green human resource development and management also had significant positive effects on corporate productivity, efficiency, and profitability, stakeholder satisfaction, green marketing, and government support. These findings show that human resource systems are not merely internal administrative mechanisms but can serve as strategic enablers of environmental and marketing performance. Green human resource development can enhance employees' environmental knowledge, skills, motivation, and participation, thereby improving operational efficiency

and the consistency of sustainability-oriented service delivery. By enabling employees to enact the organization's environmental commitments, it can also improve stakeholder perceptions and reinforce the credibility of green marketing. This finding is conceptually compatible with research emphasizing multistage and omnichannel approaches to social marketing, where behavior change is supported through coordinated interactions across different points of contact (16). Within an organization, employees represent one such channel, and their behavior shapes the experience of customers, regulators, and other stakeholders.

The MICMAC findings provide further support for the hierarchical model by showing that corporate culture and managerial commitment are high-driving, low-dependence variables, whereas customer and stakeholder satisfaction, government support, green marketing, and corporate performance are more dependent on other variables. This pattern is theoretically coherent because culture and managerial commitment function as upstream conditions, whereas satisfaction, external support, and performance are downstream manifestations of the system. In practical terms, the model suggests that managers should not attempt to improve stakeholder satisfaction or green marketing outcomes in isolation. Instead, these outcomes are likely to improve when foundational organizational conditions and intermediate environmental capabilities are strengthened. This systemic interpretation is aligned with the multilevel understanding of sustainability-oriented social marketing, in which individual, organizational, institutional, and policy-level factors interact to produce behavioral and societal outcomes (20). It is also compatible with research showing that social marketing in business settings consists of multiple interrelated components rather than a single intervention (17).

The results of the Importance–Performance Map Analysis further strengthen the managerial relevance of the proposed model. The concentration of the principal relationships in the high-importance/high-performance quadrant indicates that the identified structural relationships are not only statistically significant but also practically consequential. Particularly, the relationships from environmental compliance to competitive capacity and green human resource development had the highest importance. This finding reinforces the central role of environmental compliance as a strategic bridge between internal organizational foundations and external performance. In effect, organizations that strengthen environmental compliance may simultaneously enhance competitive resources and internal human capabilities. This supports the argument that environmental responsibility should be integrated into strategic management rather than treated as an isolated compliance function. Research on sustainability-focused social marketing similarly suggests that effective interventions require alignment between social objectives, organizational capabilities, and behavior-change mechanisms (5). Moreover, innovative communication technologies can strengthen social marketing effects when substantive organizational commitments already exist (13). Thus, communication and promotion should complement, rather than substitute for, underlying environmental performance.

Taken together, the findings support a comprehensive view of environmentally friendly social marketing in which organizational culture and managerial commitment initiate a sequence of effects through corporate social responsibility and environmental compliance, which then strengthen green human resource development and competitive capacity and ultimately contribute to green marketing, stakeholder satisfaction, government support, and organizational performance. This structure integrates internal organizational conditions with external market and stakeholder outcomes and is consistent with the broader evolution of social marketing toward sustainability, relationship management, and responsible behavior. Previous research has demonstrated the usefulness of social marketing in fostering prosocial behavior (1), strengthening sustainable consumer behavior (2), supporting

consumer relationships (9), influencing behavior through communication (12), and facilitating environmental attitudes and action (4). The present study extends these insights by organizing them into a validated hierarchical model tailored to the environmental performance challenges of oil companies.

This study has several limitations that should be considered when interpreting the findings. First, the research was conducted within the context of Iranian oil companies, which may limit the generalizability of the model to other industries or national settings with different regulatory, institutional, environmental, and cultural conditions. Second, the expert-based ISM phase relied on the judgments of a relatively small group of specialists, and although this is consistent with the logic of interpretive structural modeling, different expert panels may generate somewhat different structural relationships. Third, the quantitative phase used cross-sectional questionnaire data, which limits the ability to establish temporal causality among the constructs. Fourth, the data were based primarily on self-reported perceptions and may therefore be affected by common method bias or socially desirable responses, particularly for constructs such as corporate social responsibility and environmental commitment. Finally, although the integrated ISM-SEM-IPMA approach provides a multidimensional assessment of the model, the study did not incorporate objective environmental performance indicators such as emissions, energy efficiency, waste reduction, or environmental compliance records.

Future studies should test the proposed model in other energy-intensive industries, such as petrochemicals, mining, steel, transportation, and power generation, to evaluate its external validity and identify sector-specific differences. Comparative studies across countries could also clarify how regulatory systems, institutional pressures, cultural conditions, and environmental policies alter the relationships among organizational culture, managerial commitment, environmental compliance, and green marketing. Longitudinal research would be particularly valuable for examining whether changes in managerial commitment or environmental practices produce subsequent improvements in competitive capacity and environmental performance over time. Future researchers could also combine perceptual measures with objective environmental indicators and archival organizational data. In addition, qualitative comparative analysis, system dynamics, longitudinal SEM, or multigroup PLS-SEM could be employed to identify alternative causal configurations and subgroup differences. Further research may also extend the model by incorporating green innovation, environmental reputation, stakeholder pressure, digital sustainability communication, green supply chain management, environmental risk, and regulatory intensity.

Managers of oil companies should prioritize the foundational variables identified in the model rather than concentrating exclusively on downstream outcomes such as profitability or green marketing. Senior managers should explicitly incorporate environmental and social responsibility into strategic plans, performance evaluation systems, resource allocation, and managerial training. Organizational culture should be strengthened through internal communication, leadership behavior, environmental values, employee participation, and consistent reward systems. Environmental requirements should be integrated into all stages of product and service development and supported by measurable standards, monitoring mechanisms, and accountability procedures. Human resource policies should include green recruitment, environmental training, sustainability-related performance criteria, and employee empowerment. Companies should also ensure that green marketing claims are directly supported by demonstrable environmental practices in order to increase credibility and stakeholder trust. Finally, m anagers should use the high-importance relationships identified by IPMA as priority areas for investment, particularly by strengthening environmental compliance as a mechanism for improving competitive capacity and developing green human resources.

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Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

All ethical principles were adheried in conducting and writing this article.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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