Designing a Financial Model for Oil, Gas, and Petrochemical Industry Projects Based on Corporate Governance Approach

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Abstract

Financing oil, gas, and petrochemical industry projects, as a critical pillar of economic growth and development, requires a transparent and effective mechanism. The objective of the present study is to design a financial model for oil, gas, and petrochemical industry projects based on a corporate governance approach. This research is exploratory in nature and adopts a qualitative methodology. The study was conducted through interviews with 15 experts in the field. A snowball sampling method was employed for data collection, and the extracted data from documents and interviews were categorized and analyzed using thematic analysis. Ultimately, 60 initial codes, 17 basic themes, and 7 organizing themes were identified. The organizing themes include: the role of banks in supporting energy projects, banking and credit policies and regulations for the energy sector, bank facilities available for oil, gas, and petrochemical projects, risk management in energy projects, credit evaluation indicators for energy-oriented companies, financing challenges in the oil and gas industry, and stability and sustainability of energy-based companies. Finally, the interpretive structural modeling (ISM) method was used to derive the final model. The proposed model can ultimately serve as a strategic framework for policymakers, financial institutions, and energy industry managers to improve the financing process through a transparent, accountable, and sustainable approach.

Keywords: *Financing, Corporate Governance, Oil Industry Projects, Gas and Petrochemical Projects.*

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1. Introduction

The financing of large-scale industrial projects, particularly in the oil, gas, and petrochemical sectors, plays a pivotal role in national economic development and energy security. Given the capital-intensive nature of these industries, establishing a robust, transparent, and accountable financial structure is essential for project sustainability, risk mitigation, and stakeholder trust. In recent decades, the growing complexity of corporate financial environments, coupled with heightened scrutiny of governance standards, has spurred research into financing mechanisms that align with both market dynamics and regulatory expectations [1]. The increasing pressure on firms to balance operational efficiency with financial solvency has made it crucial to explore comprehensive models of project financing that are both scalable and adaptable to sectoral conditions [2].

Corporate governance has emerged as a foundational element in shaping financing outcomes, particularly during periods of financial instability. Governance structures not only influence managerial decision-making but also affect the transparency and reliability of financial reporting, thereby altering investor perceptions and risk assessments [3]. Strong governance mechanisms are linked to improved investment efficiency and reduced financing frictions, especially in emerging markets and sectors characterized by volatility such as oil and gas [4]. Moreover, recent empirical studies underscore the sensitivity of investment to internal cash flows under different governance conditions, reaffirming the role of corporate oversight in shaping capital allocation strategies [5].

The Iranian energy sector, which remains central to the country's macroeconomic stability and export revenues, faces unique challenges in securing long-term and diversified sources of finance. These challenges are compounded by international sanctions, fluctuating oil prices, and institutional rigidities in the domestic banking system [6]. Consequently, reliance on conventional financing tools has become increasingly inadequate, calling for more innovative and legally sound mechanisms that ensure liquidity while maintaining compliance with corporate governance norms [7, 8]. In this context, the integration of interpretive structural modeling (ISM) serves as an effective methodological tool to deconstruct and hierarchize the interdependencies among financing variables and governance components.

In examining corporate financing models, it is essential to account for the differential impacts of financial constraints across firm sizes and sectors. Small and medium enterprises (SMEs), for instance, tend to face higher transaction costs and limited access to credit compared to larger corporations [9]. These constraints often affect capital investment decisions and long-term growth trajectories. Similar dynamics are evident in the energy industry, where the capital intensity of projects demands more favorable financing conditions and efficient risk-sharing arrangements [10]. International experiences also reveal that leveraging public investment as a fiscal multiplier requires attention to corporate balance sheets and creditworthiness, further reinforcing the role of financial structure in shaping development outcomes [11].

In Iran's energy finance landscape, studies show that banking regulations, risk management frameworks, and credit assessment protocols are not adequately synchronized to address the specific needs of energy-sector firms [12]. The underdevelopment of capital markets and limited use of innovative tools such as sukuk and factoring have led to a reliance on inefficient debt structures and state-backed loans [13]. The need for reform is underscored by evidence suggesting that financing strategies directly affect investment sensitivity and firm behavior, especially during crises when access to external capital becomes constrained [9, 14]. Furthermore, financial institutions must adapt to evolving legal frameworks and adopt more agile mechanisms for credit evaluation, particularly for high-risk, high-reward industries like oil and gas [6].

Corporate financing in the oil, gas, and petrochemical industries also requires attention to macroeconomic and institutional variables. Studies have demonstrated that factors such as interest rate policies, currency volatility, and international investor sentiment significantly impact the feasibility and sustainability of energy projects [15]. Moreover, governance quality and financial reporting transparency are critical in enhancing investor confidence and enabling firms to access diversified funding channels such as bonds, venture capital, and structured finance [16]. In this regard, integrating models of financing with strategic corporate governance practices can improve resource allocation and risk forecasting across project phases [17].

With the advent of financial technology (fintech), opportunities for financial inclusion and innovation in project finance have expanded. In particular, fintech tools can facilitate access to funding for micro, small, and medium enterprises (MSMEs) in the energy supply chain, supporting the development of localized procurement systems and ancillary services [18]. By digitizing credit scoring, contract execution, and payment systems, fintech offers a complementary pathway to traditional banking in energy finance. These innovations also promote greater accountability and traceability, which are essential for aligning financing with governance objectives and environmental standards [19].

In terms of methodological contributions, this study applies interpretive structural modeling to develop a conceptual model that maps the financial enablers and governance components influencing project financing in the oil, gas, and petrochemical sectors. ISM has been widely recognized as a suitable tool for managing complexity and visualizing systemic relationships among key variables [20]. By organizing financing factors into hierarchical levels based on influence and dependence, ISM enables decision-makers to prioritize policy interventions and allocate resources efficiently. The approach also facilitates scenario planning by incorporating expert judgment and domain-specific knowledge into the model-building process [19].

Additionally, the interplay between financing structures and organizational governance is evident in both international and Iranian contexts. Research indicates that companies with transparent governance frameworks are more likely to adopt strategic financing methods that reduce costs and enhance shareholder value [4, 15]. Furthermore, when governance systems are weak or misaligned, even well-designed financing schemes may fail to achieve intended outcomes, particularly in volatile sectors. This dual dependency underscores the importance of incorporating governance variables directly into financial model design [3, 5].

Overall, the imperative to design effective and governance-oriented financing models is underscored by the convergence of financial, legal, and operational risks inherent in the energy sector. This research seeks to offer a structured, context-sensitive model that can guide both policymakers and energy sector managers in optimizing financing strategies.

2. Methodology

The present study is exploratory in nature (aiming to construct concepts, models, and frameworks). From an orientation perspective, it is fundamental; in terms of research philosophy, it is interpretivist; and the primary strategy is methodological pluralism, employing two strategies simultaneously. The research is based on a qualitative approach, combining thematic analysis and interpretive structural modeling (ISM). In the first stage, key themes related to the concept of financing are extracted using thematic analysis. In the next step, the extracted themes are structured and the interrelationships among the main themes are modeled based on the recommended procedure of the ISM method.

Data required for a research project can be collected through both library-based methods, including literature review, and field methods such as questionnaires, interviews, etc. In this study, for the thematic analysis phase, expert interviews were conducted, while in the ISM phase, a researcher-made questionnaire was used.

Given the objective of the study, the questionnaire was tailored to the research topic and distributed among experts and specialists. Thus, the statistical population of the study consists of experts and specialists in banking, monetary, and financial sectors within the oil, gas, and petrochemical industries.

In the thematic analysis phase, data were collected from interviews with 17 experts based on the principle of theoretical saturation using the snowball sampling method. Theoretical saturation refers to the point at which no new information is provided by interviewees, and subsequent data become repetitive.

Additionally, for implementing the ISM methodology, the questionnaire was distributed among experts, resulting in the collection of 15 completed questionnaires that formed the basis of this study.

Qualitative researchers, to enhance the credibility of their work, are expected to employ at least two strategies. To meet this requirement, the following actions were taken in the present study:

- **Member Checking**: Feedback was obtained from three members with doctoral degrees in economics, financial management, and project and construction management on the research process report and data. Several concepts were revised according to their suggested corrections.
- **Prolonged Engagement**: Due to the compelling nature of the topic and the researcher's meticulous inquiry into the concepts under discussion, the literature review process was relatively time-consuming.
- **Triangulation**: To ensure diversity in the reviewed texts, an effort was made to analyze all types of

textual data, including books, articles, reports, and analyses published in various databases.

Additionally, according to Creswell (2003), two methods were used to ensure the reliability of the research: a) detailed and precise note-taking, and b) anonymous coding by individuals not involved in the research team.

Data analysis in the thematic analysis method is based on a coding process. A theme represents the conceptual pattern found in the data and is related to the research questions. This method is a process for analyzing textual data (obtained from interviews) and transforms scattered and diverse data into rich and detailed information. The thematic network is systematically formed through the following four steps: reading the text, making meaningful interpretations from seemingly unrelated information, analyzing qualitative data, and systematically observing individuals, interactions, groups, organizational situations, or cultures. The following components are systematized:

- **Basic Themes**: Codes and key points derived from the interviews.
- **Organizing Themes**: Categories formed through the synthesis and summarization of basic themes.
- **Global Themes**: Overarching themes that capture the governing principles of the text as a whole.

These themes are then illustrated as web-like network maps, where prominent themes at each of the three levels mentioned above are presented along with the relationships between them. The thematic network is not a tool for preparing preliminary reports or final results but rather a means of breaking down the text and identifying meaningful and salient points within it.

Interpretive Structural Modeling (ISM) is an interactive learning process in which a set of various and interrelated elements is structured into a comprehensive and systematic model. This method intersects disciplines such as mathematics, graph theory, social sciences, group decision-making, and computer science. ISM helps establish order in the complex relationships among elements in a system and identifies internal relationships among variables. It is a suitable technique for analyzing the influence of one variable on others. As an interpretive method, ISM aims to provide a collective judgment about the relationships among variables based on group decisions. It is interpretive because group judgment determines which elements are related and the nature of those relationships. At the same time, it is structural because it extracts an overall structure from a complex set of elements based on their existing relationships. Finally, the relationships among the elements and the overall structure are depicted and presented in a graphical model.

3. Findings and Results

In the first step, all interview data were reviewed to gain familiarity with the content. Following repeated readings, 60 open codes were extracted in the second step. In the next phase, basic themes emerged through the analysis and synthesis of the annotated statements. Subsequently, in the fourth step, based on the emergence of 17 basic themes, 7 organizing themes were identified. In the fifth step, considering the organizing themes and the researcher’s developed mental framework during the study, seven overarching (global) themes were determined. Patterns and themes within the data can be identified through either an inductive (bottom-up) or theoretical-deductive (top-down) approach. In the inductive approach, the identified themes are more directly connected to the collected data, whereas in the theoretical-deductive approach, themes stem from the researcher’s theoretical interests and are drawn from prior literature and professional background. When little theory exists on a subject, it is more appropriate to adopt an inductive approach. Therefore, this study employed an inductive approach to extract the basic, organizing, and overarching themes. The 17 basic themes, 7 organizing themes, and 1 global theme derived from 60 open codes across all existing texts related to the financing of active projects within the framework of corporate governance are presented in Table 1.

Table 1. Thematic Analysis Results with Code Frequency

Organizing Themes	Basic Themes	Open Codes	Code Frequency
Credit Evaluation Indicators of Energy-Oriented Companies	Customer-Centric Approach in Energy Value Chain	Satisfaction of downstream industry clients (petrochemicals, refineries, exporters)	11
		Quality of oil and gas products	9
		Continuous improvement of drilling, refining, and petrochemical processes	15
		Accurate identification of industrial and international consumer needs	13

	Profitability of the Company	Control of exploration, extraction, transport, and refining costs	10
		Net profit margin of energy projects	9
		High sales in domestic and export oil and gas markets	13
		Working capital provision for ongoing operations	16
		Existence of fixed assets and infrastructure	16
	Documentation Review	Exclusion from loss-making energy projects	12
		Submission of audited financial statements by reputable firms	14
		High equity ratio in energy projects	12
		Detailed credit assessment of contractors, operators, and users	8
		Specialized inquiries from regulatory bodies in the energy sector	15
Banking and Credit Policies for the Energy Industry	Monetary Policy	Expansionary policies for developing national energy projects	7
		Contractionary policies under sanctions or declining oil revenue	16
	Financing Facilitation	Relaxed collateral conditions for energy companies	8
		Simplification of bank guarantees for energy projects	14
		Discounted loan rates for joint field development	4
		Increased loan caps for upstream/downstream projects	13
		Timely allocation of financial resources to priority projects	7
Role of Banks in Supporting Energy Projects	Direct Role	Channeling idle liquidity toward oil and gas chain investments	9
		Rapid and low-cost financing for emergency energy projects	12
		Diversification in financial sourcing (oil participation bonds, foreign finance)	9
	Indirect Role	Formulating credit policies tailored to energy sector risks	14
		Working capital financing for equipment, catalysts, and feedstock	10
		Planning timely capital injections into project operational phases	9
Banking Facilities Applicable to Oil, Gas, and Petrochemical Projects	Micro-Level	Working capital for oil projects	16
		Use of oil pre-sale instruments	16
		Civil partnership in energy projects	12
	Macro-Level	Use of foreign exchange drafts for importing oil equipment	12
		Use of domestic and international letters of credit	7
		Utilization of National Development Fund loans for energy projects	15
Risk Management in Energy Projects	Specialization	Access to accurate financial data of energy companies	8
		Comprehensive evaluation of implementing companies	14
		Review of past financial and operational performance	14
		Design of a financial tree structure for oil projects	13
		Identification of export target markets	10
		In-depth knowledge of capabilities of active energy firms	7
	Guarantees and Collateral	Acceptance of credible collaterals suitable for energy projects	9
		Technical and financial credit rating of energy companies	8
		Securing credible guarantees	12
	Oversight	Employment of expert financial and energy consultants	9

		Verification of equipment invoice authenticity and contracts	14
Stability and Sustainability of Energy-Oriented Companies	Gaining Credibility	Presentation of transparent and authentic financial statements	11
		Timely fulfillment of financial and time-bound obligations	6
	Use of Advanced Technologies	Use of artificial intelligence for reservoir exploration and demand forecasting	9
		Use of blockchain for smart oil contracts and export transparency	5
		Upgrading digital banking systems in energy-oriented operations	11
	Operational Performance	Enhancing labor productivity in refineries and oil platforms	9
		Supply chain management for energy industry equipment and materials	15
		Innovation in petrochemical products and formulation of compounds	13
		Reducing the production and delivery cycle time of energy products	10
Financing Challenges in the Oil and Gas Industry	Internal Challenges	Mandatory loan provisions and pressure on banks	9
		Limited banking resources for energy-oriented projects	13
	External Challenges	Issues in securing imported feedstock, equipment, and catalysts	16
		Exchange rate fluctuations and impact on energy import costs	16
		Global oil, gas, and product price volatility	12
		Instability in macroeconomic and political indicators	14
		Increased total execution cost of energy projects	12

The Structural Self-Interaction Matrix (SSIM) is the first matrix used in Interpretive Structural Modeling (ISM). This matrix is employed to identify internal relationships among variables based on expert perspectives. The matrix developed in this step shows which variables influence others and which ones are influenced. Conventionally, symbols such as those in Table 2 are used to identify patterns of relationships among elements.

Table 2. Symbols and Relationship States Used to Describe Variable Interactions

Symbol	V	A	X	O
Meaning	Variable *i* influences *j*	Variable *j* influences *i*	Mutual relationship	No relationship

The SSIM is formed by evaluating the dimensions and indicators of the study using the four conceptual relationship states. The resulting data are summarized based on the ISM methodology to form the final SSIM. According to the notations in Table 2, the SSIM is presented in Table 3.

Table 3. Structural Self-Interaction Matrix (SSIM)

SSIM	C01	C02	C03	C04	C05	C06	C07
C01	-	V	V	V	X	O	O
C02		-	A	A	O	A	A
C03			-	A	O	X	O
C04				-	O	V	V
C05					-	A	A
C06						-	O
C07							-

The Reachability Matrix is derived by converting the SSIM into a binary (0 and 1) matrix. In the Reachability Matrix, the diagonal elements are set to one. Additionally, transitivity of relationships must be verified. This means that if A leads to B and B leads to C, then A must lead to C. If such transitive effects are not reflected in practice, the matrix must be adjusted to include them. The finalized Reachability Matrix for the model variables is shown in Table 4.

Table 4. Reachability Matrix (RM) for Variables

RM	C01	C02	C03	C04	C05	C06	C07
C01	0	1	1	1	0	1	1
C02	0	0	0	0	0	0	0
C03	0	1	0	0	0	1	1
C04	1	1	1	0	0	1	1
C05	0	0	0	0	0	0	0
C06	0	1	1	0	1	0	1
C07	0	1	1	0	1	1	0

After obtaining the initial Reachability Matrix, the final Reachability Matrix is generated by incorporating transitive relationships among variables. This is a square matrix in which each element is set to 1 if there is any path of any length from one element to another; otherwise, it is 0. The method for generating the Reachability Matrix is based on Euler's theory, where the adjacency matrix is added to the identity matrix. The matrix is then exponentiated until no further changes in elements occur.

Thus, transitive relationships must be verified. If A leads to B and B leads to C, then A must also lead to C. If such a direct relationship is not captured initially, the matrix must be corrected to reflect this transitive connection. The final Reachability Matrix for variables related to the financing of projects aimed at establishing corporate governance is presented in the table below.

Table 5. Final Reachability Matrix for Variables

RM	C01	C02	C03	C04	C05	C06
C01	1	1	1	1	1*	1
C02	0	1	0	0	1*	0
C03	0	1	1	0	0	1
C04	1	1	1	1	1*	1
C05	0	0	1*	0	1	0
C06	1*	1	1	0	1	1

To determine relationships and the hierarchical levels of the criteria, the Reachability Set and the Antecedent Set for each variable are extracted from the Reachability Matrix:

- **Reachability Set (Rows/Outputs/Influences):** Variables that can be reached from this variable.
- **Antecedent Set (Columns/Inputs/Influenced by):** Variables from which this variable can be reached.

Table 6. Input and Output Sets for Level Identification

Variable	Symbol	Reachability Set (Rows)	Antecedent Set (Columns)	Intersection	Level
Role of Banks in Supporting Energy Projects	C01	C02, C03, C04, C05, C06, C07	C01, C07	C07	1
Bank Facilities for Oil, Gas, and Petrochemical Projects	C02	C02, C03, C04, C06	C01, C06, C07, C08	C06	1
Financing Challenges in Oil and Gas Industry	C03	C03, C07	C01, C03	C03	1
Credit Evaluation Indicators of Energy-Based Companies	C04	C01, C02, C03, C04, C06, C07	C01, C04, C08	C01, C04	2
Risk Management in Energy Projects	C05	C01, C02, C03, C05, C07	C01, C03, C05, C06	C01, C03, C05	3
Banking and Credit Policies for Energy Industry	C06	C02, C06, C07	C01, C02, C03, C04, C05, C06, C07, C08	C02, C06, C07	3
Stability and Sustainability of Energy-Based Companies	C07	C01, C02, C03, C04, C06, C07	C01, C04, C05, C06	C01, C04, C05, C06	4

The Reachability Set includes the criterion itself and the variables it influences. The Antecedent Set includes the criterion itself and the variables that influence it. The intersection of these two sets is then determined. For variable C_i, the Reachability Set consists of variables that can be accessed through C_i, while the Antecedent Set includes variables through which C_i can be reached. Once these sets are defined, their intersection is calculated. The first variable for which the intersection equals the Reachability Set is considered at the first level. Therefore, first-level elements are those with the highest degree of influence. After determining the level, the identified criterion is removed from all sets, and the process is repeated to determine the next level.

The final hierarchical model of the identified variables is illustrated in figure below, where only meaningful relationships between elements at each level and the level below, as well as significant internal relationships within each level, are represented.

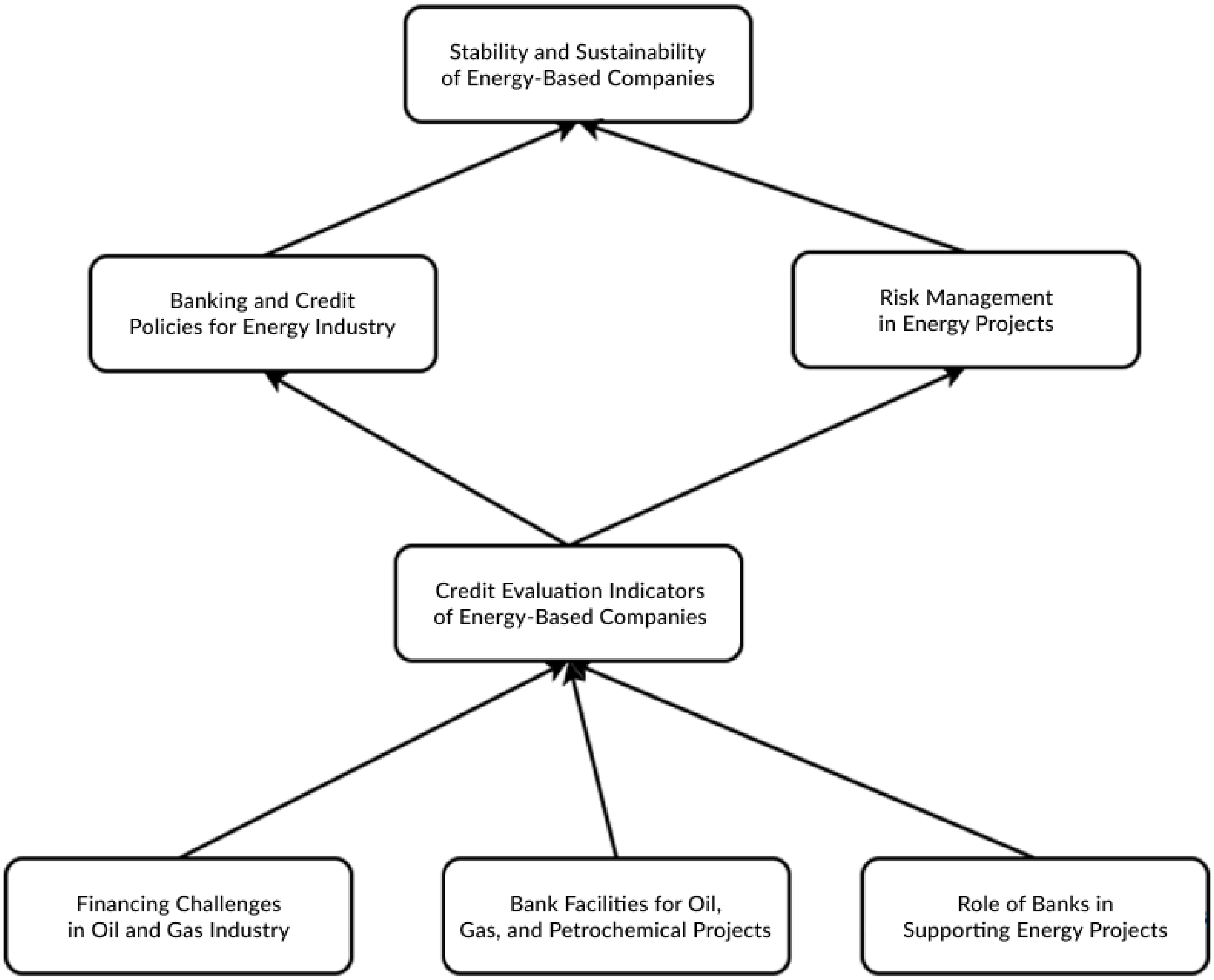

Figure 1. Model Design Based on Dimensions and Components

In the Interpretive Structural Modeling (ISM) framework, the reciprocal relationships and influences among the criteria, as well as the connections between different levels of criteria, are clearly demonstrated, enabling managers to gain a better understanding of the decision-making space. To identify key criteria, the driving power and dependency of the variables are determined using the final reachability matrix. The driving power and dependency chart for the studied variables is shown in the table below.

Table 7. Driving Power and Dependency of Variables

Factors	C01	C02	C03	C04	C05	C06
Driving Power	6	4	5	5	4	6
Dependency	3	4	2	2	6	1

To determine the key criteria based on driving power and dependency, the final reachability matrix is utilized. Figure 2 presents the driving power–dependency diagram for the studied variables, categorized into four quadrants: Autonomous (I), Dependent (II), Linkage (III), and Independent (IV).

- Autonomous: Autonomous variables have low dependency and low driving power. These criteria are generally detached from the system due to their weak connections. Changes in these variables do not significantly affect the system.
- Dependent: Dependent variables exhibit strong dependency and low driving power. These variables are highly influenced by the system but exert minimal influence on it.
- Independent: Independent variables have low dependency and high driving power. In other words, they significantly influence the system while being minimally influenced by it.
- Linkage: Linkage variables possess both high dependency and high driving power. That is, they exert and receive strong influence. Any minor change in these variables can lead to substantial changes in the system.

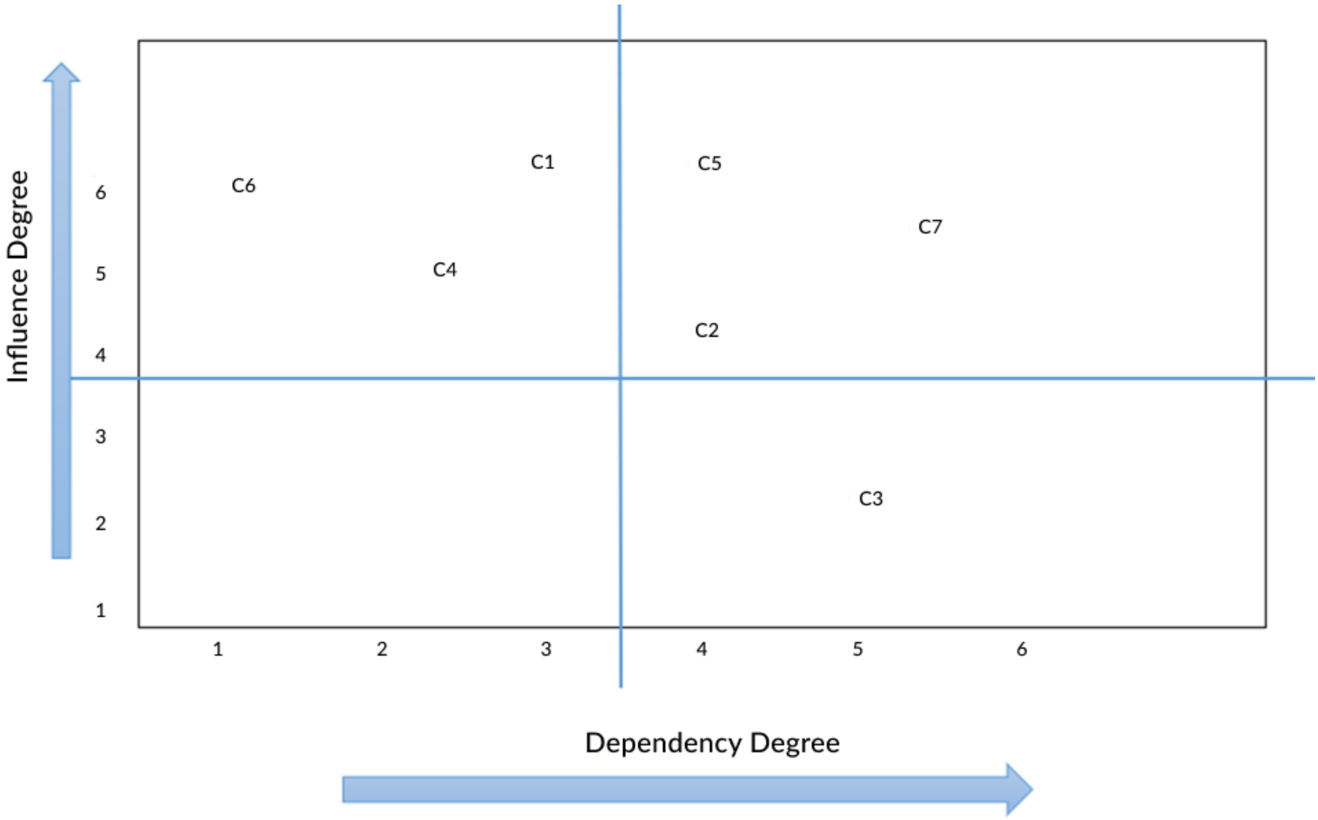

Figure 2. Driving Power and Dependency Diagram (MICMAC Output)

Based on the driving power–dependency diagram, it can be stated that the variable "Role of Banks in Supporting Energy Projects" (C01), along with "Credit Evaluation Indicators of Energy-Based Companies" (C04) and "Banking and Credit Policies for the Energy Industry" (C06), are located in the independent quadrant, indicating high influence and low dependency—meaning they significantly affect the system while being less affected by it.

The variables "Risk Management in Energy Projects" (C05), "Stability and Sustainability of Energy-Based Companies" (C07), and "Banking Facilities Applicable to Oil, Gas, and Petrochemical Projects" (C02) fall within the linkage quadrant, characterized by both high influence and high sensitivity. These are dynamic variables whose small changes can trigger major transformations in the system.

The variable "Financing Challenges in the Oil and Gas Industry" (C03) falls in the dependent quadrant, meaning it is strongly influenced by other variables but has weak influence over the system itself.

It is noteworthy that no variable is located in the autonomous quadrant.

4. Discussion and Conclusion

The findings of this study highlight the multi-layered and interdependent nature of financing mechanisms in the oil, gas, and petrochemical industries, particularly when viewed through the lens of corporate governance. Using interpretive structural modeling (ISM), the results categorized the financing variables into a hierarchical structure based on their driving power and dependency. Among the most influential and independent variables identified were the role of banks in supporting energy projects (C01), credit evaluation indicators of energy-oriented companies (C04), and banking and credit regulations for the energy sector (C06). These variables exhibited high driving power with low dependency, indicating that they serve as foundational inputs for the stability and effectiveness of the broader financing system. This finding is consistent with prior research emphasizing the need for robust financial institutions and regulatory coherence in energy finance ecosystems [6, 15].

Another critical insight pertains to the classification of variables such as risk management in energy projects (C05), financial sustainability of energy companies (C07), and bankable facilities for petrochemical projects (C02) as linkage variables. These dimensions demonstrated both high influence and high sensitivity, meaning they are central levers within the system whose alteration can trigger systemic transformation. This aligns with the theoretical proposition that energy project financing is not solely determined by static factors but is rather shaped by dynamic interactions among risk mitigation, institutional support, and adaptive credit structures [10, 16]. Furthermore, the identification of financing challenges in the oil and gas sector (C03) as a dependent variable confirms that these barriers are symptoms of broader systemic gaps rather than root causes. This classification is corroborated by previous studies that show how external volatility and internal inefficiencies collectively exacerbate funding bottlenecks in energy projects [2, 9].

The structural self-interaction matrix (SSIM) and the final reachability matrix developed in this study allowed for clear visualization of the inter-variable relationships. For instance, C01 (role of banks) was found to influence nearly all other variables, indicating the central role of financial institutions in shaping the financing environment for large-scale industrial projects. This finding is echoed by research that underlines the strategic function of banking institutions in developing credit lines, project financing guarantees, and liquidity support for capital-intensive sectors [1, 13]. Likewise, creditworthiness indicators, such as profitability, audited financial statements, and asset holdings, were recognized as pivotal determinants in accessing diversified finance. These indicators resonate with governance-focused financial models where risk-adjusted returns and transparency in financial disclosures are prerequisites for external financing [3, 4].

Furthermore, the findings reveal that regulatory policies—including expansionary monetary policies, interest rate incentives, and structured loan packages—play a critical role in enabling financial access, particularly under constrained macroeconomic conditions. This result validates the conclusions of Espinoza et al. (2020), who showed that public investment fiscal multipliers are significantly shaped by the financial stability of corporations and regulatory environments [11]. In addition, the emphasis on regulatory facilitation for collateral and bank guarantees is consistent with the arguments posed by Solavatian and Hosseini Dowlatabadi (2019), who observed that procedural rigidities in sukuk and debt issuance processes often hinder capital market development in the Iranian context [8].

The placement of variables such as C05 and C06 in the linkage quadrant suggests that effective risk management strategies and responsive regulatory frameworks act as feedback loops within the system. This corroborates the work of Asadbeigi et al. (2019), who proposed that contract-based financing and factoring arrangements can reduce transactional inefficiencies and mitigate systemic risks in volatile markets [7]. Additionally, the role of technological innovation—such as blockchain for contract transparency and artificial intelligence for forecasting—is underlined as a future-oriented dimension embedded within the sustainability variables (C07). These findings align with recent literature advocating for fintech-enabled governance models to enhance efficiency and accountability in corporate financing [18].

The ISM methodology applied in this study further enables the stratification of financing variables into four conceptual levels, offering a diagnostic tool for decision-makers to prioritize interventions. For instance, variables located in the lower levels of the model, such as financial sustainability and regulatory consistency, act as prerequisites for the higher-order variables, including credit access and financing innovation. This stratification confirms prior conceptual frameworks that argue for a bottom-up sequencing of reforms in developing robust financing systems [12, 14]. Moreover, the MICMAC analysis employed reveals that the interaction between driving power and dependency should be interpreted not just as static relationships, but as leverage points for systemic resilience.

Overall, the findings reinforce the notion that financing oil, gas, and petrochemical projects cannot be treated as a one-dimensional challenge. Instead, it requires a composite model that integrates financial, institutional, and technological components, each with varying degrees of influence and interdependence. The importance of corporate governance in this structure is paramount, acting as the connective tissue that aligns managerial incentives, investor expectations, and regulatory compliance. Research by Sprenger and Lazareva (2022) similarly found that governance improvements in Russian unlisted firms led to reduced investment-cash flow sensitivity, underscoring the strategic value of governance in financial modeling [5].

This study, while comprehensive in its structural modeling approach, is subject to several limitations. First, the qualitative design and reliance on expert judgment may introduce subjective bias in the interpretation of inter-variable relationships, particularly during the SSIM and MICMAC analyses. Although methodological triangulation was employed to enhance credibility, the conclusions remain largely dependent on the expertise and perspectives of a specific group of professionals. Second, the contextual specificity to the Iranian energy sector limits the generalizability of the findings to other geopolitical or financial environments. The institutional constraints, regulatory frameworks, and financing practices prevalent in Iran may differ significantly from those in other emerging or developed economies. Third, the use of interpretive structural modeling, while effective in hierarchical structuring, does not quantify the intensity or statistical strength of the relationships, thus precluding predictive inferences or econometric validations.

Future studies may consider expanding the empirical scope by integrating quantitative data and statistical techniques, such as structural equation modeling (SEM) or fuzzy MICMAC, to complement the interpretive approach. This would provide greater rigor in assessing the intensity of relationships among financing variables and allow for hypothesis testing across different industry settings. Moreover, cross-country comparative studies could be valuable in identifying universal versus context-specific determinants of financing success in capital-intensive sectors. It would also be beneficial to explore the longitudinal impact of regulatory reforms, macroeconomic shocks, and technological disruptions on financing models through time-series or panel data analyses. Finally, incorporating stakeholder perspectives—such as those of investors, regulators, and contractors—could provide a more holistic understanding of the institutional dynamics that shape financing outcomes.

Practitioners, including policymakers, financial institutions, and corporate managers in the energy sector, should consider adopting a multi-layered approach to financing that integrates corporate governance principles at every stage of the funding cycle. Emphasizing transparency in financial reporting, ensuring regulatory coherence, and strengthening risk management protocols are essential for enhancing investor confidence and creditworthiness. Furthermore, diversification of financing tools—ranging from traditional bank loans to capital market instruments and fintech-based platforms—can provide flexibility in matching financing structures to project needs. Strategic investments in digital infrastructure, data analytics, and legal frameworks are also necessary to improve credit assessments and enforceability of contracts, thus reducing systemic risk and increasing financing efficiency.

Authors' Contributions

Authors equally contributed to this article.

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Declaration of Interest

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All procedures performed in this study were under the ethical standards.

References

[1] S. Abdolmaleki, "Examining the Role of Financing Methods in Improving Investor Decision-Making Behavior in Tehran Stock Exchange," *Applied Studies in Management and Development Sciences,* vol. 2, no. 2, pp. 41-53, 2017.

[2] H. Faraji Hajikandi, "Examining the Relationship Between Financing, Investment Efficiency, and Financial Crisis," Summer 2020, 2020.

[3] M. Nodehi, "Corporate Governance and Financing During Financial Crisis in Companies Listed on Tehran Stock Exchange," 2017.

[4] M. Li and L. Song, "Corporate governance, accounting information environment and investment-cash flow sensitivity," *International Journal of Accounting & Information Management,* vol. 26, no. 4, pp. 492-507, 2018, doi: 10.1108/IJAIM-04-2017-0049.

[5] C. Sprenger and O. Lazareva, "Corporate governance and investment-cash flow sensitivity: Evidence from Russian unlisted firms," *Journal of Comparative Economics,* vol. 50, no. 1, pp. 71-100, 2022, doi: 10.1016/j.jce.2021.05.004.

[6] M. Ghamami and N. Khan Zadeh, "Examining the Legal Aspects of Corporate Financing," *Quarterly Journal of Private Law Studies,* vol. 51, no. 2, pp. 335-353, 2021.

[7] M. E. A. Asadbeigi, M. Ranaei, and M. Khosravi, "Application of Factoring in Business Financing and Introduction of Contract-Based Financing Methods," pp. 1-25, May 2019 2019.

[8] M. A. Solavatian and S. M. Hosseini Dowlatabadi, "Challenges of Business Financing Through Issuance of Sukuk (Islamic Financial Instruments)," pp. 1-23, October 2019 2019.

[9] S. Zubair, R. Kabir, and X. Huang, "Does the financial crisis change the effect of financing on investment? Evidence from private SMEs," *Journal of Business Research,* vol. 110, pp. 456-463, 2020, doi: 10.1016/j.jbusres.2020.01.063.

[10] F. Chien, Q. T. Ngo, C. C. Hsu, K. Y. Chau, and R. Iram, "Assessing the mechanism of barriers towards green finance and public spending in small and medium enterprises from developed countries," *Environmental Science and Pollution Research,* vol. 28, no. 43SP - 495, p. 510, 2021, doi: 10.1007/s11356-021-14907-1.

[11] R. A. Espinoza, J. Gamboa-Arbelaez, and M. Sy, *The fiscal multiplier of public investment: The role of corporate balance sheet*. 2020.

[12] K. Rostami, A. Shiri, E. Mohammadi, and A. Yasini, "Designing a Financing Model for Cooperative Companies in Ilam Province," *Cooperation and Agriculture,* vol. 7, no. 25, pp. 119-145, 2018.

[13] S. Babalouyan, *Introduction to Models and Methods of Corporate Financing*. Tehran: Financial Academy Publishing, Omid Investment Management Group, 2020, pp. 1-80.

[14] M. Ahmadian, M. Shahbazi Ghiathi, S. A. Sayyah, and S. E. Khandoozi, "Financing Model for Small and Medium Enterprises: Microfinance; Global Experience and the Situation in Iran," 2016.

[15] M. Taheri and A. Jalili, "Financial Constraints in Companies and Their Relationship with Financing Strategies, Emphasizing the Moderating Role of Corporate Governance," *Asset Management and Financing,* vol. 11IS - 2, pp. 1-18, 2023.

[16] S. Edwards, D. Allen, and S. Shaik, "Finance, institutions and human development: Evidence from developing countries," *Economic Research-Ekonomska Istraživanja,* vol. 31, no. 1, pp. 1-17, 2018.

[17] A. Arabmazar, M. Nemati, and A. Darvishi, "Examining the Effect of Lending Relationships on the Transaction Costs of Bank Loans: A Case Study of Agricultural Bank," 2017.

[18] A. A. Hapsari and D. M. Puspitasari, "The influence of financial technology on the advancement of financial inclusion in micro, small, and medium enterprises (MSMEs) in West Java," *Accounting Studies and Tax Journal (COUNT),* vol. 1, no. 1, pp. 48-60, 2024, doi: 10.62207/5v4t9q48.

[19] M. Aghli, S. Nikmanesh, H. Rashidi, and P. Jalali, *Thesis Writing and Article Composition*. Tehran: Dibagaran Book Institute, 2023.

[20] K. J. Chung, S. D. Lin, and H. M. Srivastava, "The complete and concrete solution procedures for integrated vendor-buyer cooperative inventory models with trade credit financing in supply chain management," *Applied Mathematics and Information Sciences,* vol. 10, no. 1, pp. 155-171, 2016, doi: 10.18576/amis/100115.