The Conceptual Framework of Supplier Relationship Development in the Abadan Refinery with a Focus on Value Co-Creation Based on the Grounded Theory

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ABSTRACT:

The present study aims to design the value co-creation-driven supplier relationship model in the Abadan refinery. In terms of type and paradigm, the research is a qualitative interpretive study conducted with the grounded theory and Strauss and Corbin's model. An inductive approach is taken as the research method. The study is also a cross-sectional survey in terms of time horizon and strategy, respectively. Secondary information and data were collected using the library research method, and the data collection was conducted through the field technique. A review of research literature and records in national and international journals and databases provided the basis for the library research method, and interviews were conducted for the field technique based on an approved protocol by supervisor and advisor professors over the main research questions. The population included all members of the Abadan refinery's trading commission, senior experts and managers of logistics in the Abadan refinery, senior experts and managers of the Abadan refinery's legal and contract services, and the CEO and deputy CEO of parts and materials suppliers for the Abadan refinery with regular participation over the past five years. Therefore, the researcher used the snowball sampling method to identify the foremost experts, and 21 individuals were interviewed to reach the theoretical saturation. The semi-structured interviews were utilized for data collection. The test-retest and intercoder reliability methods were used to determine the research reliability. Moreover, the research findings, which were obtained based on three open, axial, and selective coding stages, show that a total number of 103 concepts were attained from data collection and classified into 25 subcategories through coding. Finally, the results indicate that value co-creation-driven supplier relationship is formulated in the form of five classes (main categories), i.e., casual conditions, context conditions, core category, intervening conditions, strategies, and consequences..

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1. Introduction

Nowadays, excessive competition in supplying goods and services has been globally an irrefutable fact over the past two decades, with exacerbating effects on other common human activities. Suppliers find their goods and services in conditions that essentially impose competition on them to survive; one is to organize the internal affairs and create the potentials that require competitive strength, and the other is to form an organized, dynamic, and strong relationship with other corresponding members, such as customers and suppliers. In other words, the cases of internal success within an institution are not sufficient to bring success in competitive markets and offer survival. Rather, the cases of success within the whole chain in which the institution presents its goods and services should be relied upon. "Supply chain management" is the product of such an account, which is taken as a type of systemic belief in the dimension of goods and services supply (Kazzazi et al., 2014: 81).

Organizations have realized that agility and flexibility in the face of changes and crises are contingent on outsourcing the organization's non-fundamental operations. They have also found that they will gain more profits provided that they focus more on their organization's competitive advantages. Hence, supplier selection has been a challenge for most organizations. Given the crucial effect of supplier performance on an organization's success or failure, selecting the best supplier is regarded as a strategic task.

Now that the market has become more competitive, many firms stress the efficiency improvement of logistic operation and management. Outsourcing is currently applied as one of the principal strategies for companies to hone in on their primary competence, reduce costs, and increase profits. In addition to cost savings, outsourcing offers other benefits, such as reduced market delivery time and enhanced work quality. Outsourcing or collaborating with a supplier is one of the finest strategies if a company lacks the skills and expertise to perform a specific task. A supplier can help the customer firm minimize the required time for production and logistics (Zhu, 2015:1).

In the outsourcing process, an especially significant consideration is the relationship with suppliers to synergize value. The term 'synergy' comes from the Greek 'synerga' that contextually implies collaboration and working together with similar meanings in various science fields. In medical terminology, synergy is defined as "any substance or muscle cooperating with another substance or muscle." In physics, synergy is "the increased impact from the combination of two forces, which is greater than that of the actual individual amount." In music, the combination of two notes or two sounds produces additional energy and has a more intense and different effect than a single note. In the context of human behavior and social psychology, synergy is "the

amplified behavior and creating a whole that is greater than the sum of its constituting behaviors" (Madah & Salavati Sarcheshmeh, 2005:36).

In traditional marketing science, models of interaction and transaction are derived from the economy and developed within the goods-dominant logic. The goods-dominant logic was focused on tangible resources and the embedded value in goods and transactions. However, the emergence of the service-dominant logic in recent decades has drawn marketers' attention toward intangible resources, the set of skills and knowledge, value co-creation, and communication (Homburg et al., 2017; Mainardes et al., 2017).

The prevalence of the service-dominant logic redirected the trends from producers to customers, raising the topic of value co-creation. Initial marketing studies hardly distinguished value from its price-associated notion. However, this concept gradually exceeded economic definitions and was described with distinction from the economic aspect (Ge & Gretzel, 2018).

Outsourcing redirects suppliers' focus toward intangible resources, the set of skills and knowledge, value co-creation, and communications (Jaakkola & Alexander, 2014; Homburg et al., 2017; Mainardes et al., 2017).

Customers participate in value creation and share their resources (especially their skills and knowledge) with suppliers in the process (Mainardes et al., 2017; Lusch &Vargo, 2006; Vargo & Lusch, 2004; Ranjbarfard & Heidari, 2018).

In outsourcing, the seller and buyer enter an interactive and communicative process for value creation (Brodie et al., 2013), and one-way communications are replaced by mutual and dialogue-oriented communications (Greoger et al., 2016; Hollebeek et al., 2016).

Iran's exceptional circumstances regarding oil have given rise to the formation of various companies in the oil, gas, and petroleum industries. These companies have grown in different aspects in terms of both number and scope. The majority of organizations involved with these industries are expansive and diverse, with several projects under their command. Therefore, to undertake these large-scale and manifold projects, highly qualified engineering and contractor companies are required in technical, engineering, financial, and particularly management areas. Extensive research has been conducted so far on supplier relationships, while value co-creation has been missed as a primary variable in outsourcing, which indicates the necessity of investigating the research topic in the oil industry. Value creation is typically a topic of interest in holding organizations. Therefore, project-oriented oil companies hardly provide a research study that comprehensively addresses value creation in supplier relationships within the oil industry units and particularly an oil refinery. A review of the research background shows that

most studies on value co-creation are theoretical and conceptual, and relevant research literature faces a critical gap regarding concept indices and inclusive measuring tools for constituent elements of value co-creation. This issue makes it difficult to find empirical applications of value co-creation discussions in investigating the place of organizations and suppliers in terms of meeting the value co-creation requirements. On the other hand, previous research often addresses the intricate concept of value co-creation from the perspective of either the suppliers or the organization unilaterally. While authors have written extensively about the significance of value co-creation, there are limited studies on developing the elements of value co-creation as capabilities and actions toward shared value creation from an organizational viewpoint. Thus, developing a value co-creation framework with value co-creation elements for organizations and customers can resolve the aforesaid gaps and contribute to expanding the boundaries of relevant knowledge. The present study explores the value co-creation construct as a concept shaped within a mutual relationship with suppliers from an integrated viewpoint of organization and customer capabilities in value co-creation.

Therefore, this research seeks to design the value co-creation-driven supplier relationship model in the Abadan refinery.

2. Theoretical Research Foundations

2-1. Supplier

Customer demands, a short lifecycle of goods, increased competition, and globalization are some phenomena that result in rapid changes within business environments. Customers constantly demand organizations more value in terms of time, space, form, status, and assets, and organizations have no choice but to respond to the changes if they are to remain in the competition (Hasanzadeh & Jafarian, 2016). Therefore, environmental pressures have recently led to the supply chain and its proper management becoming an influencing factor in successful presence within competitive markets. This factor is regarded as a competitive advantage for firms. Accordingly, a crucial topic of interest is supplier evaluation and selection, which is the process of evaluating, comparing, and finding the right supplier who can meet the buyer's need with the highest expected quality in the right size and place at the right time (Amiri & Jahani, 2017).

Table 1: Supplier evaluation criteria (Akbari & Ebrahimpour, 2017).

Reference & year	Supplier selection criteria
Dickson (2012)	Quality, timely delivery, executive background, returns and guarantee scheme, production capability, price, technical capability, financial status, complaint system, communication system, prestige and reputation, interest in business, organization management, performance controls, after-sales services, personnel conduct and behavior, the company's position, packaging capability, personnel's workplace relationships, geographic location, the extent of previous businesses, training aids, the extent of bilateral agreements
Miiralidhartin et al. (2013)	Quality, timely delivery, price, technical capability, financial status, supplier work experience, flexibility, services
Hurriphreys et al. (2015)	Price, quality, supplier brand costs, using environment-friendly materials, flexibility, reputation & prestige, supplier's brand
Choy et al. (2016)	Price, time, delivery, customer satisfaction, product quality, after-sales services, making the supplier flexible, workplace relationships & culture
Dulmin et al. (2017)	Quality, time, delivery, product costs, customer satisfaction, management costs, and transport process
Wang et al. (2004)	Delivery credit, flexibility, delivery, supply chain response time, price, product flexibility, product transport costs, product guarantee cost or returned parts costs, return on investment
Degraeve et al. (2004)	Costs, quality, price, finished product, history of collaboration with the supplier, supplier competence and experience, capability & honesty of sales employees
Bharadwaj et al. (2004)	Timely delivery, product quality, ability to respond to urgent requests, transparency in financial accounts and statements, ability to design products, after-sales services, product price
Lin et al. (2005)	Finished product quality, costs, delivery time, trust, flexibility & innovation, collaboration & partnership, long-term relationships between customers and suppliers, new supplier development technology acceptance, transparent financial performance, ability to design products, quality of product components
Liu and Hai (2005)	Quality, responsiveness, timely delivery, financial capability, management, technical capability, supplier facilities
Araz et al. (2006)	Financial capability, reliability, flexibility, information flow mode, product quality, timely delivery

2-2. Supply Chain Management

Supply chain management is indeed the evolved version of logistic management. That is, the fundamental characteristics of supply chain management can be observed upon the completion of logistic management over the past 30 years. Logistics is always associated with the management of synchronizing the needs of every single firm to attain products and services along with the available resources from suppliers on the one hand and distributive tasks to meet

the customer needs on the other hand. The concept of supply chain management, enhanced through the enabling power of Internet technology, is the maturation of these fundamental value-added functions (Feizabadi & Karimi Dastjerdi, 2011).

According to Jafarnejad et al. (2013), supply chain management includes managing an integrated set of activities, such as planning, coordinating, and controlling the transfer of materials, parts, and finished goods from suppliers to customers. To this end, the information, materials, and financial flows are managed as decisions made at strategic, tactical, and operational levels.

Modern supply chain management aims to mitigate risk and uncertainty in the supply chain, positively affects inventory levels, cycle time, business processes, and customer delivery lead time, and generally improves customer value and satisfaction, profitability (lower costs), and distinctive advantage. The chain is a dynamic process encompassing simultaneous activities, regular evaluations from involved parties, embedded technologies, and organizational structure. This technology offers customers a variety of options and increased access to information. Overall, all the said factors contribute to transferring customer value and enhancing profitability and competitiveness (Jafarnejad et al., 2013).

2-3. Value Co-Creation

The necessity of co-creation success lies in understanding why customers tend to participate in co-creation. Consumers only tend to share their creative ideas, express their product preferences honestly, and, provided that their expectations are met, spend a certain amount of time modifying the concept of current products; therefore, customer expectations and motives should be considered to make the most of co-creation potential (Oldmat, 2015:19).

The advantages of co-creation are being increasingly recognized in marketing, making it an appealing approach for firms. In the research literature, these advantages can be divided into internal and external.

A relationship seems to run between co-creation and benefit for goods and services (Fauch & Sherier, 2017:3). Consumer empowerment enables participants to produce better products close to customer needs, which results in higher commercial potential and market acceptance. At the same time, co-creation reduces costs. Consumer input can replace employee input.

In addition, the costless achievement of consumer ideas and their outputs lowers the need for traditional marketing research and employees. There is also a relationship between co-creation and mitigating the risk of product failure, accelerating the market, and reducing inventory maintenance costs. These are the internal advantages of co-creation. The external advantage of

co-creation can result in consumer behavioral intentions, such as purchase intent, oral advertisement, and willingness to pay more (Oldmat, 2015:14).

2-4. Perceived Value

Customer-perceived value is an essential element in the firm's competitive strategy. In recent years, this concept has drawn extensive attention in the marketing literature. Customers are more interested in their expected value, services, and quality, all of which create competitive opportunities in the market. Many companies and industries are rapidly improving the quality of their values, products, and services. Values are a driving force in directing operations, attitudes, and judgments in all aspects of our daily life. Zeithaml defines customer-perceived value as the result of a personal comparison between total benefit and total customer cost. The achievement of perceived value is customer behavioral tendencies (Ebrahimi & Mansouri, 2013:6).

In other words, perceived value is comparing what the customers lose in deals and what they gain. What the customer sacrifices can be financial (such as costs and prices) or non-financial (e.g., time and effort). Whatever customers gain in a deal is their expected value (such as the expected product value). Therefore, customer-received benefits should be increased, and customer-paid sacrifices (such as costs, time, and effort) should be reduced to maximize the perceived value (Haddadian et al., 2016:4).

The role of perceived value gains increasing significance between consumers and marketers because it is one of the most influential forces in today's markets. In value marketing, value is usually described according to the consumer's point of view. The most widely accepted concept of value in marketing is defined in terms such as efficiency, quality, and price (Ryu et al., 2018: 20).

According to Porter's value chain (1985), in value co-creation, the customer is not outside the value-creation process and is not considered a passive value-receiving actor. Rather, the customer participates in value co-creation through interaction with the firm and partners. Michael Porter introduced the value chain as a means of finding ways to create more value for customers. According to this model, every enterprise is a combination of activities for product design, production, marketing, supply, and support. The value chain identifies nine corresponding strategic activities that create value and costs in a specific enterprise. These nine value-creating activities include five main and four support activities.

2-5. Outsourcing and Value Co-Creation

The co-creation plan is a revolutionary approach to design in which stakeholders actively participate in the design process. Beyond collaboration with other firms, this process implies building interdisciplinary teams or making usual designer-user relationships that can be used by, for instance, architects and their clients. Co-creation is associated with creating common values by the firm and its customers. Through this process, customers can experience services that suit their conditions. Accordingly, a co-creation system is based on making building blocks to enable the interaction between the firm and its customers, followed by facilitation in the co-creation experience. These building blocks include dialogue (conversation), access, transparency, and risk assessment (DART). A well-tuned dialogue between the firm and its customer is required to achieve a joint solution. The dialogue, and as a result, solving the problem is most effective when customers have full access to transparent sources of information from the firm. Finally, the first three building blocks enable customers to make a comprehensive and risk-free assessment of their decision to participate in the co-creation process (Vazifehdoust & Ghalandari, 2016).

Therefore, the crowdsourcing principle is closely linked to most co-creation design measures. Crowdsourcing can be regarded as a type of co-creation in which everybody (the crowd) is invited to participate in the co-creation process (this invitation is not only extended to the firm's customers or a group of them). The word 'crowdsourcing' was coined by Jeff Howe, who describes it as follows: In all human societies, the crowd has depended on closeness. People had to be physically together to form a population. Industrial advancements that emerged upon the advent of the Internet allowed people to communicate through the internet. A new development in the history of humankind is indeed the principle that implies societies can be formed based on shared preferences and interests in a specific subject (Akbari & Jamshidi, 2014:8).

3. Research Background

In a study titled "Introducing a Model of Value Co-Creation with Customers in the Tourism Industry," Javashi Jadid et al. (2020) developed a GTM-based model in tourism and concluded that implementing the value co-creation process with customers in tourism can contribute to more effective use of customer potentials and capacities to achieve a competitive advantage, promote the organizational bran, and attain positive economic, cultural, social, political, and environmental outcomes. In a study titled "Investigating the effect of outsourcing on productivity (case study: Ilam Gas Treating Co.)," Azadi et al. (2019) showed that outsourcing the organization's activities affects its dimensions of productivity (including management control, focus on key capabilities, alignment with the firm's strategy, strategic dependency, reduced costs,

service quality, flexibility, and pace of activities). In a study titled "Strategic Value Co-Creation Model in Banking Industry (Value Creation in a New Paradigm)," Rahmanseresht et al. (2018) concluded that the strategic value co-creation model has two dimensions, i.e., the organizational value co-creation (with components such as marketing skill, service development skill, communication skill, information technology (IT) skill, organization skill, organizational culture, and human resource management) and the customer value co-creation (with components such as aid in product development, interactive skill, feedbacking, loyalty, and responsible behavior). In a study on identifying and ranking the influential factors of imports of goods for domestic suppliers in the oil and gas and petrochemical industry (case study: Pars Kala Gas Co. (KGC)), Rafati et al. (2017) concluded that six factors, i.e., lack of domestic production of the given product, absence of support from Iranian executive managers for domestic manufacturers, low customs tariff for some imported goods, the client's need for original foreign goods, lack of raw materials for production in the country, and fluctuations in the rate of Iranian Rial against other currencies in the Iranian market, respectively. The findings can be purposefully beneficial for domestic supplier companies in terms of import planning and management, domestic production planning in collaboration with domestic manufacturers, and marketing industrial and specialized products that are not made in the country. In a study titled "Elaboration of Value-Creating Functions in Project-Oriented Oil Companies," Abbaspour Shoushtari et al. (2016) concluded that value-creating functions include support, central services and resources, and synergetic and integrative actions. On the other hand, destructive functions include value-destructive functions associated with support, value-destructive functions from providing central services and resources (overhead costs), value-destructive functions caused by synergetic measures (resource scarcity), and value-destructive functions due to integrative measures (complexity).

In a study titled "The State of Outsourcing in the Canadian Mining Industry," Baatartogtokh, Dunbar, and Zyl showed that outsourcing has led to increased flexibility, reduced fixed asset investment, reduced fixed costs, and focus on primary activities. In a study titled "Performance Evaluation of Outsourcing Decision," Modak, Pathak, and Ghosh (2017) developed a performance evaluation framework based on the balanced scorecard (BSC) and fuzzy analytic hierarchy process (AHP) to analyze the suitability of strategic outsourcing decisions for the Indian coal mining organization. The findings introduced the proposed framework as an analytical tool in strategy formulation and logical guidance for management purposes based on performance improvement. Hollebeek et al. (2016) and Bowden et al. (2017) found that vendors

dedicate their knowledge and potential to producing and branding products and services, and customers utilize their knowledge and capabilities in the everyday use of goods and services.

In a study titled "A System Dynamics Approach to Logistics Outsourcing Policies and Decisions," Franco, Yoshizaki, and Vieira (2016) showed that the model examined the pre- and post-outsourcing costs and showed their effect on the trend of the net present value (NPV). The findings imply that operation supervision is required to achieve desired financial results. Furthermore, the dynamics model provides the guidelines for the contract period. In a study regarding the dynamic modeling for outsourcing projects with poor quality and delivery delay, Ojugbele and Bodhanya (2015) indicated that constant outsourcing increases the resignation rate among technical employees. While outsourcing may initially help decrease the number of delayed projects, it eventually fails, and the generated dynamic processes reflect the effects of outsourcing. According to Brown & Wilson (2015), it may be necessary for a firm to restructure to gain a prominent position in the market. Restructuring, along with the use of outsourcing, enables the organization to benefit from the experience of professionals and experts (outsourcing organizations with expertise in outsourcing services). Williams (2014) suggests that competence, capacity, and culture are the constructs that shape the framework of organizational capabilities for value creation. Tapscott & Williams (2013) discussed the intra-organizational factors that develop value co-creation. These factors include desirable culture, befitting insight, planning, skills, and capabilities that can affect building a co-creation mindset in the organization. Several studies consider the subject of co-creation from the aspect of capabilities. In a study titled "Critical Success of the Offshore Outsourcing of Software Development Projects: A System Dynamics Approach," Mayrand, Cassivi, and Cloutier (2013) showed that the given factors included the degree of technical knowledge of suppliers, availability of technical experts for customers, goal-based trust, supplier transparency of internal processes, control-supervising mechanism, and project outcomes. Grisseman and Stockburger (2012) investigated the relationship between the level of company support (as a stimulant of co-creation) and customer loyalty. The results indicated that the more support the parent company offers to outsourced companies, the greater the co-creation between them, resulting in customer loyalty.

4. Research Methodology

In terms of type and paradigm, the research is a qualitative interpretive study conducted with the grounded theory and Strauss and Corbin's model. As the research method, an inductive approach is taken in which the aim is to investigate the design of the supplier relation model for the Abadan refinery toward value co-creation based on the opinion of experts, theoreticians, and

senior managers of the Abadan refinery, suppliers of the Abadan refinery, and senior employees in the logistics department. Afterward, the model is to be determined based on the inductive method using the gathered information. To this end, informed authorities and scientific methods were also applied. The study is also a cross-sectional survey in terms of time horizon and strategy, respectively. That is, the research is not conducted longitudinally, and within a cross-sectional study, the researcher performed the interviews and gathered the data on developing the supplier relationship model of the Abadan refinery toward value co-creation. Secondary information and data were collected using the library research method, and the data collection was conducted through the field technique. A review of research literature and records in national and international journals and databases provided the basis for the library research method, and interviews were conducted for the field technique. The research technique is interviewing, which is based on an approved protocol by the supervisor and advisor professors over the main research questions. The population included all members of the Abadan refinery's trading commission, senior experts and managers of logistics in the Abadan refinery, senior experts and managers of the Abadan refinery's legal and contract services, and the CEO and deputy CEO of parts and materials suppliers for the Abadan refinery with regular participation over the past five years. Therefore, the researcher used the snowball sampling method to identify the foremost experts, and 21 individuals were interviewed. Based on the snowball sampling technique, one or two experts from each group were first interviewed and asked to introduce other experts to participate in the research according to the research topic. The semi-structured interviews were utilized for data collection. In this type of interview, general subjects and questions are typically raised, new questions are structured during the interview, and interviewees are also asked about these newly-formed questions.

Three approaches, i.e., systematic, emergent, and inductive, are introduced to implement the grounded theory strategy (Sarlak, 2016). In this research, the systematic approach by Strauss and Corbin (causal conditions, context conditions, core category, intervening conditions, strategies, and consequences) is applied. The core category is the subjective form obtained from a phenomenon that is core to the process. Causal conditions are the categories related to the conditions that affect the core category. Context conditions are circumstances or underlying factors that affect the realization of strategies. Intervening conditions are the obstacles or context conditions that prevent the strategies from being accomplished. Strategies are actions or reactions that originate from the core phenomenon. Consequences are outputs from adopting strategies (Aeeni & Abdolhosseinzadeh, 2017).

The coding process is applied in analyzing the GTM-originated data. During the coding process, data are decomposed, conceptualized, and, finally, put together differently (Flick, 2009). Strauss and Corbin divided the coding process into three stages, i.e., open (free), axial, and selective coding. These three stages are not necessarily separated; they contribute to each other during the research process. The analysis process begins with open coding and ideally ends with selective coding (Strauss & Corbin, 2006).

In this research, re-test reliability and inter-subject agreement method are applied to calculate the reliability of the conducted interviews.

The method to calculate the re-test reliability between the researcher's coders within two intervals (which is the consistency index) is as follows (Khastar, 2009):

$$test - retest\ reliability\ (\%) = \frac{number\ of\ agreements \times 2}{total\ number\ of\ codes} \times 100$$

To calculate the test-retest reliability, three interviews were selected from all the conducted interviews; each selected interview was coded twice by the researcher within a 30-day interval. The coding results are shown in Table 2.

Table 2: Calculation of test-retest reliability

No.	Interview title	Total number of codes	Number of agreements	Number of disagreements	Test-retest reliability (%)
1	A	36	15	2	83
2	B	28	13	1	93
3	C	24	12	0	100
Total		88	40	3	90

As shown in Table 2, the total number of codes in two 30-day intervals is 88, the total number of intercoder agreements within the same intervals is 40, and the total number of disagreements within the same intervals is 3. Given the above formula, the test-retest reliability of the interviews is 90%. Considering that the level of reliability is above 60% (Kvale, 1996), the coding's trustworthiness is verified.

Intercoder reliability is obtained as follows:

It is calculated using the following formula. The coding results are shown in Table 3.

$$inter - subject\ agreement\ (\%) = \frac{number\ of\ agreements \times\ 2}{total\ number\ of\ codes} \times \%100$$

Table 3: Calculation of intercoder reliability

No.	Interview title	Total number of codes	Number of agreements	Number of disagreements	Intercoder reliability (%)
1	A	36	16	2	83
2	B	29	12	2	93
3	C	25	11	0	100
Total		88	38	4	90

As shown in Table 3, the total number of codes recorded by the researcher and research collaborator is 88, the total number of intercoder agreements is 38, and the total number of intercoder disagreements is 4. Using the above formula, the intercoder reliability for the research interviews is 86%, which is higher than 60%; therefore, the intercoder reliability is confirmed, and it can be suggested that the interview analysis has suitable reliability.

5. Findings

In grounded theory, the process of information analysis is founded on open, axial, and selective coding methods or theory construction. These concepts are described as follows:

A: Open Coding

Through open coding, concepts are identified, and data aspects and features are discovered. During this stage of grounded theory, the researcher seeks to identify primary categories corresponding to the phenomenon that is being studied. The following table shows an example of open coding.

Table 4: An example of open coding in research

Open code	Concept	Document
Think tank	To handle and consult with the major suppliers of the Abadan refinery, a think tank is required to solve the problems between the parties, and the CEO and board members should be informed of the final results.	Interviews 8 and 13
	The trading commission is typically individual-oriented, the focus on the refinery is on the inside and senior authorities. Therefore, think tanks and supplier alignment are less attended.	Interviews 1 and 14
	The refinery and supplier should regard each other as strategic partners. The supplier company should play an advisory and empathetic role to be coordinated with the refinery and supplying the ordered parts, especially in specialized machinery and equipment, specialized personnel, and continuous processes. The refinery should provide the supplier with the necessary information.	Interviews 4 and 6

Table 4 displays the results from open coding the interview-based collected qualitative data. Finally, a total number of 29 open codes were identified within 103 concepts.

B: Axial and Selective Coding

In this stage, categories and subcategories are connected, given their characteristics and aspects. The aim is to establish a connection between the generated categories in the open coding stage. This method is carried out based on the paradigm model.

During the last stage, selective coding, the researcher attempts to strengthen the coding process using the identified codes and concepts, systematically linking the core category to other categories, providing research proof of those relations, and creating an image based on the relationships between the categories. The procedure generally aims to formulate a theory based on the collected data. Thus, certain relationships are formed, leading to designing and developing a theoretical model based on the constructed categories and cores. In light of the above, the selective and axial coding is shown in the following table.

Table 5: Axial and selective coding

Core category	Sub-category	Open codes	repetition
Causal factors	Organizational structure	Unsuitable and non-agile organizational structure	5
		Redundant bureaucracy and paperwork	3
		Parallel working by the refinery's vendor list and the center's system	8
	Means of communication	The management of means of communication	7
		Effective communication	9
		Poor performance of the means of communication for informing, discussion, consulting, participation, and individual/group interactions with domestic and international suppliers	3
	Organizational context	Contextualizing the supplier participation environment and making the strategic plan for the business environment	3
		Delegating authority to various levels for decision-making and helping solve the supplier's problems	2
		Executive processes	11
Strategies	Management systems reform	Management entrenchment to actualize the primary and long-term achievements	5
		Operationalizing the context and maximizing the capacities by selecting competent, capable, and professional managers	3
		Preparing a comprehensive and integrated management system and the corresponding application	6
	Strategic Partnership	Identifying the financial, technical, legal, national, and international dimensions	3
		Identifying the suppliers in association with the refinery's strategic goals	8
		Identifying the sanction-caused limitations	6
	Supplier risk mitigation and empowerment	Suitable advance payments	5
		Negative consequences of the sanctions for the country (Iran)	5
		Increasing national interests in various aspects by delegating to suppliers	4
	supplier significance and level identification	The effective level of suppliers in preparing a healthy, flawless, and highly reliable division	3
		Using scientific methods to determine the stakeholder's level of significance and priority	6
		Ranking suppliers based on urgency and access	4

Core category	Sub-category	Open codes	repetition
Context factors	the identification of stakeholders and suppliers	Identifying all representatives of supplying and manufacturing parts, goods, and pieces of machinery at international and domestic levels	3
		Identifying domestic and foreign and domestic interest groups and supplier companies	4
		Using rational supplier selection criteria, especially regarding environmental pollutants or international standards and certificates	3
	Supplier capability analysis	Identifying and analyzing benefits, strengths, urgency, and inner interactions of each supplier in different areas	5
		Predicting and analyzing the behavior and possibility of support or rejection by suppliers	4
		Identifying and understanding the supplier expectations in the form of a joint workgroup between the refinery and suppliers	3
	Motivational factors	Think tank	3
		Supplier network	4
		Optimal budget allocation and payment prioritization	3
		Motivic development of suppliers and brokers	4
	Feedback system	Multilateral communications and discourse	4
		Publicizing the results along with giving solid and acceptable reasons to suppliers	5
		Continuous modification and control	3
	the evaluation of improvement options	The proper definition of improvement indices	7
		Considering the suppliers' environmental plans	4
		Social responsibility and indexing for suppliers to follow	9
	Organizational climate	Interaction-based organizational culture	3
		Management entrenchment	6
	Goal-oriented management	Defining clear and measurable goals regarding suppliers	5
		Continuous communication system and formulation of a suitable win-win model for the refinery and suppliers	4
		Detecting the issues regarding suppliers and access to goals via continuous monitoring	4
	Supplier satisfaction measurement	Measuring supplier satisfaction	5
		Taking a holistic approach and making constant changes in the indices of supplier satisfaction	4

Core category	Sub-category	Open codes	repetition
		measurement	
		Meeting the needs of all the interest groups via proportional pricing and market interactions	3
	Supplier feedback and communication facilitation	Improving the sense of collaboration and participation	3
		Improving transparency in organizational processes and rules and regulations	3
		Reforming the refinery's structure to face the challenges and opportunities toward continuous supplier feedback	3
	Industry characteristics	Clarifying the refinery's position, mission, goals, policies, and philosophy	3
Intervening factors		Technologies in use	4
		Dependency on foreign countries for equipment	4
	Environmental conditions	Dividing the environmental risks between the employer and supplier	3
		Considering the immediate society's values and ethics	4
		The organization's environmental factors (human, economic, bio-environmental, and social factors based on their significance in any given period)	3
	Legal Requirements	Unifying the laws	3
		Evaluating the legality of some of the suppliers in decision-making	3
		Updating the changes in inflation and financial principles of governmental trading rules and regulations	4
	National resources protection	Overlapping the personal and organizational goals by highlighting the national role	5
		Boosting national interests and contributing to meeting the country's needs through the refinery and suppliers	3
		Focusing on domestic markets	3
	Supplier and stakeholder consequences	Supplier satisfaction	5
		Reducing negative conflicts between the refinery and suppliers	5
		Enhancing transparency and trust between suppliers and collaboration with the refinery	4
Consequences	Organizational consequences	Reducing the negative side effects of effective supplier relationship	4
		Enhancing the refinery's effectiveness and efficiency	3
		Systematizing the procedures, social capital, and social	3

Core category	Sub-category	Open codes	repetition
		responsibility of the refinery	
		Improving executive processes	3
		Decision-making based on benefit and cost	6
	National consequences	Improving domestic production	6
		Job creation	5
		Corporate social responsibility	9
		Self-sufficiency and less dependency	7
		Enhancing national trust	6
		Importing currency rates and reducing production costs	5
		Sustainable development	3
	Effective and continuous value co-creation	Understanding and using the contracting parties' hierarchy of values	4
		Internal coherence and building trust in supplying goods with transparency and commitment	4
		Increasing the level of supplier participation	4
		Effectiveness of recommendations	5
	Rational decision-making	Improving decision-making processes	6
		Decentralizing the decisions and delegation	5
		Calculating all the options and conditions using rational and logical techniques	4
		Supplier selection based on universality and justice	5
		Evidentialism and adapting the organization's rules based on environmental factors and conditions	6
		Education for performance accountability	4
		innovation	3

In the grounded theory method (GTM), categories are defined and described according to their subsets' key concepts and highlights. In other words, this method relies heavily on first-hand data; and in the induction process, abstract "concepts" and then more abstract "categories" are constructed from key highlights of open coding. Therefore, each concept or category is defined based on the path to its emergence. In terms of title, the given concept/category may have a theoretical background in the relevant subject literature, but what is attained through the grounded theory method has a distinct definition (despite the apparent similarity between its title and a sample in the subject literature) because the former originates from the compilation of available theories and experiences (second-hand data), while the latter arises from the gathered data in the research process (first-hand data). Therefore, it is inevitably necessary to refer to

research data, particularly in the open coding stage, to understand the meaning of "concepts and "categories" thoroughly.

Each category is composed of one or more concepts that indeed reflect the current or desired "characteristics," "circumstances," or "status" of the given category on a national level. The other point to note is the concurrency of "description" and "prescription" in sub- and core categories. That is, the constructed categories do not simply describe the expected desired or current status with a descriptive aspect; they also have an inscriptive aspect. In other words, each category is a 'should' or 'should not' in the path toward the desired status. In grasping a better understanding of the method's outputs, it will be particularly beneficial to consider the prescriptive aspect of categories, which, in turn, leads to the prescriptive aspect of the GTM-based 'theory.'

After the categories are identified through axial coding, their significance can be determined using the frequency of category-assigned codes. The following tables and diagrams show the software outputs regarding the frequency of the category-assigned codes for each interviewee separately.

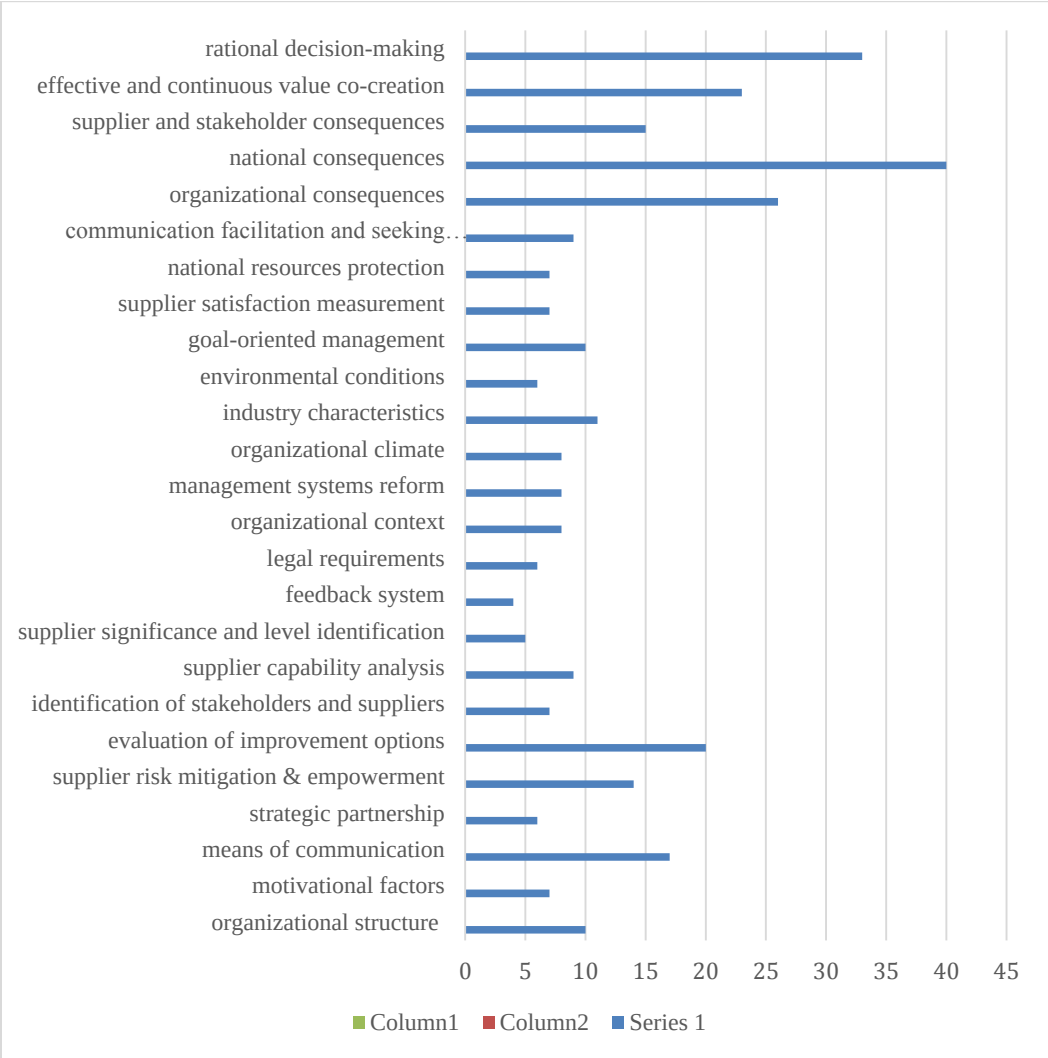

Diagram 1: The frequency of coding the supplier relationship categories toward value co-creation

As shown in Diagram 1, the national consequences category ranked first with nearly 40 times repetition of the code, followed by rational decision-making with approximately 33 times repetition, and the feedback system ranked last with almost 4 times repetition.

In selective coding, the story narration process, discovering the core category, and correlating it with other categories are carried out within the paradigm model. Thus, the given process (the obtained paradigm model) is extensively described as follows:

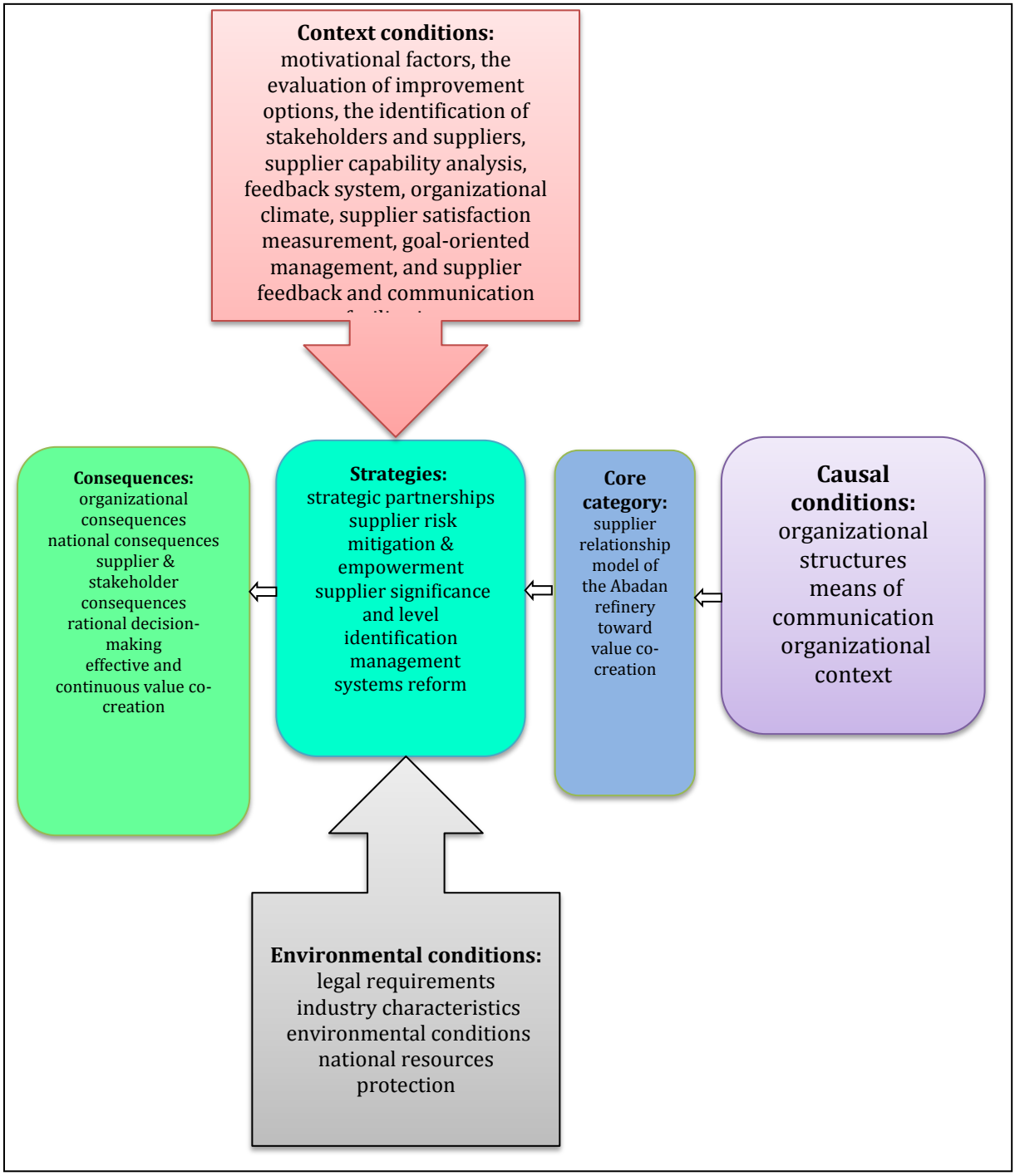

Diagram 2: The supply relationship model of the Abadan refinery toward value co-creation.

6. Discussion and Conclusion

The present research gathered the statistical data as expert opinions through interviews with 21 experts. According to the results of the data analysis, the Abadan refinery's supplier relationship approach toward value co-creation was introduced. Based on the Cochran test with a 5% error, the results can be extended to the statistical population of experts in the present

research. The core category, i.e., the research's main targeted phenomenon, is the Abadan refinery's supplier relationship approach toward value co-creation, which is the basis of a process through which all other primary categories are associated with each other. Given the research findings, the influencing factors of the phenomenon, its resulting strategies, and the outcomes and results of the given strategies are discussed.

- What is the conceptual model of the Abadan refinery's supplier relationship toward value co-creation?

In this research, the following dimensions were introduced upon the data analysis:

A. Casual/facilitating/preventive factors
B. Primary or core factors
C. Context factors
D. Intervening factors
E. Strategies
F. Consequences

These results can be extended to the statistical population of experts in the present research.

- What are the causal conditions of the Abadan refinery's supplier relationship toward value co-creation?

This research gathered the statistical data as expert opinions through interviews with 21 experts. The results of the data analysis led to the introduction of three components, i.e., organizational structures, means of communication, and organizational context. Based on the Cochran test with a 5% error, the results can be extended to the statistical population of experts in the present research. Causal conditions entail categories that directly affect the core phenomenon or create and develop it in a way that they can be found through an organized review of data and incidents. The results indicate that organizational structures, communication means, and context can be among the effective causal conditions, which is consistent with the works of Rahmanseresht et al. (2018) and Brown & Wilson (2015).

- What is the main phenomenon of the Abadan refinery's supplier relationship toward value co-creation?

This study gathered the statistical data as expert opinions through interviews with 21 experts. According to the results of the data analysis, the Abadan refinery's supplier relationship approach toward value co-creation was introduced. Based on the Cochran test with a 5% error, the results can be extended to the statistical population of experts in the present research. The core category, i.e., the research's main targeted phenomenon, is the Abadan refinery's supplier relationship approach toward value co-creation, which is the basis of a process through which all other

primary categories are associated with each other. Given the research findings, the influencing factors of the phenomenon, its resulting strategies, and the outcomes and results of the given strategies are discussed.

- What are the context conditions of the Abadan refinery's supplier relationship approach toward value co-creation?

This research gathered the statistical data as expert opinions through interviews with 21 experts. The results of the data analysis led to the introduction of motivational factors, the evaluation of improvement options, the identification of stakeholders and suppliers, supplier capability analysis, feedback system, organizational climate, supplier satisfaction measurement, goal-oriented management, and Supplier feedback and communication facilitation. Based on the Cochran test with a 5% error, the results can be extended to the statistical population of experts in the present research. In general, context conditions are external factors that organizations fail to control but affect our strategies. Regarding these factors, the interviews mostly emphasized motivational factors, the evaluation of improvement options, the identification of stakeholders and suppliers, supplier capability analysis, feedback system, organizational climate, supplier satisfaction measurement, goal-oriented management, and Supplier feedback and communication facilitation. These results are consistent with the works of Abbaspour Shoushtari et al. (2016), Baatartogtokh, Dunbar & Zyl (2018), and Ojugbele & Bodhanya (2015).

- What are the environmental conditions of the Abadan refinery's supplier relationship toward value co-creation?

This research gathered the statistical data as expert opinions through interviews with 21 experts. The results of the data analysis led to the introduction of legal requirements, industry characteristics, environmental conditions, and national resources protection. Based on the Cochran test with a 5% error, the results can be extended to the statistical population of experts in the present research. Environmental conditions moderate causal conditions and affect strategies. These results are consistent with the works of Hollebeek et al. (2016), Bowden et al. (2017), and Williams (2014).

- What are the supplier relationship strategies of the Abadan refinery toward value co-creation?

This research gathered the statistical data as expert opinions through interviews with 21 experts. The results of the data analysis led to the introduction of strategic partnerships, supplier risk mitigation and empowerment, supplier significance and level identification, and management systems reform. Based on the Cochran test with a 5% error, the results can be

extended to the statistical population of experts in the present research. Strategies are actions presented in response to the core category or phenomenon, selected purposefully, and can be used to accomplish the core phenomenon. These results are consistent with the works of Azadi et al. (2019), Rafati et al. (2017), Modak, Pathak, & Ghosh (2017), and Williams (2014).

- What are the categories of consequences in the Abadan refinery's supplier relationship approach toward value co-creation?

This research gathered the statistical data as expert opinions through interviews with 21 experts. The results of the data analysis led to the introduction of organizational consequences, national consequences, supplier and stakeholder consequences, rational decision-making, and effective and continuous value co-creation. Based on the Cochran test with a 5% error, the results can be extended to the statistical population of experts in the present research. Consequences and results originate from adopting strategies whose realization can lead to the realization of the core category if successful. These results are consistent with the works of Abbaspour Shoushtari et al. (2016), Baatartogtokh, Dunbar & Zyl (2018), and Ojugbele & Bodhanya (2015).

The following practical recommendations are presented in line with the research results:

- Management entrenchment to fulfill the organization's primary achievements in the long run.
- Operationalizing the content and maximizing the capacities by selecting competent, qualified, and professional managers.
- Fostering a 360-degree atmosphere and organizing the human resources properly to reinforce the rules and regulations of which the private sector is unaware.
- Establishing a comprehensive and integrated management system along with a unique application that is compatible with the center's system for supplier relationship management purposes.
- The organizational culture in the refinery has not been interactive-oriented for years; conservatism is prevalent, and catching red-handed, gossiping, and making accusations can be occasionally seen among the employees, particularly in sectors such as logistics, contracts & commissions, and legal affairs. Such an environment has overshadowed constructive and effective supplier relationships. To give up this culture, effective support from the organization's senior management and other relevant bodies, along with a sense of assistance and mutual understanding, can be immensely helpful.
- Maintaining consistency and avoiding personal interpretation and enforcement of rules and regulations, even for the highest-ranking authority in the organization.

- Suppliers should sense that environmental risks are not exclusive to them and that the employer also undertakes some of the risks. A prime example would be the circumstances caused by the sanctions and the COVID-19 pandemic.
- Changing the operating environment and conditions of public economic and manufacturing enterprises from centralized to decentralized by delegating authority to the organization's senior managers to make decisions about suppliers. That is, we define quantitative goals and performance for the refinery and demand managers to meet these goals and operate using the methods they prefer and based on the ethics and values of the immediate society because different conditions require different decisions.
- The refinery should try and define clear and measurable goals regarding suppliers to make better and cost-effective choices for projects of manufacturing and parts/goods supply based on such goals.
- To do so, it should be considered to preserve the continuity of the communication system, formulate a suitable win-win model for the refinery's suppliers, and provide persistent development for the actors in fulfilling the goals.
- The issues concerning suppliers and access to the goals should be constantly monitored and checked for problems, the area's needs should be taken into account with the help of academics and media groups, and the highlights should be determined so obtain reduced costs and enhanced level of production in the refinery upon increasing and developing the supplier's set of options.

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